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Bionetics Corp., Cincinnati, OH

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USEPA METHOD STUDY 35
SW METHOD 3005
ACID DIGESTION OF WATERS FOR TOTAL RECOVERABLE OR DISSOLVED METALS FOR ANALYSES BY FLAME ATOMIC ABSORPTION SPECTROSCOPY.

by

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EPA Contract No. 68-03-3254

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16. ABSTRACT

An interlaboratory collaborative study was conducted to determine the precision and bias (recovery) of Solid Waste (SW) Method 3005 for the analysis of 21 elements in ground water. SW Method 3005 is entitled, "Acid Digestion of Waters for Total Recoverable Metals for Analyses by Flame-AA" and includes instructions for quality control, sample preparation and analysis of samples by AA-Flame.

The study design was based upon Youden's non-replicate plan for collaborative tests of analytical methods. Each water type was spiked with six concentrations (as three Youden pairs) of the 21 test elements and was prepared using nitric/hydochloric acid digestion procedure and analyzed by Atomic Absorption (AA-Direct Aspiration). Test data from three spiked ground water sources were compared against reagent water which was used as a control. The resulting data were using USEPA's computer programs entitled "Interlaboratory Method Validation Study" (IMVS). This study produced, for each element, measures of precision and mean recovery for the acid digestion/AA-Direct Aspiration and compared the performance of the method between water types and reagent water.

The study was conducted by the Bionetics Corporation at the direction of the U.S. Environmental Protection Agency, Quality Assurance Research Division, Environmental Monitoring Systems Laboratory, Cincinnati, Ohio under EPA Contract No. 68-03-3254. This report covers a period of time from September 10, 1986 to December 21, 1987.

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FOREWORD

Environmental measurements are required to determine the quality of drinking water, ground waters, ambient waters and the character of waste effluents. The USEPA Environmental Monitoring and Support Laboratory EMSL - Cincinnati, conducts research to:

Develop and evaluate techniques to measure the presence and concentration of physical, chemical, and radiological pollutants in water, wastewater, bottom sediments, and solid waste.

Investigate methods for the concentration, recovery, and identification of viruses, bacteria, and other microorganisms in water.

Determine the response of aquatic organisms to water quality.

Support an Agency-wide quality assurance program to assure standardization and quality control of systems for monitoring waste and waters.

This publication of EMSL-Cincinnati, entitled EPA Method Study 35, SW Method 3005, "Acid Digestion of Waters For Total Recoverable or Dissolved Metals for Analyses by Flame Atomic Absorption Spectroscopy or Inductively Coupled Plasma Spectroscopy", reports the results of EPA'S interlaboratory method study for 21 trace elements using the total recoverable procedure with flame atomic absorption spectroscopy.

Federal agencies, states, municipalities, universities, private laboratories, and industry should find this evaluative study of assistance in monitoring and controlling pollution in the environment.

Thomas A. Clark, Director
EMSL-Cincinnati
September 1988

ABSTRACT

An interlaboratory collaborative study was conducted to determine the precision and mean recovery of Solid Waste (SW) Method 3005 for total recoverable metals by flame atomic absorption on twenty-one elements in ground water. SW Method 3005 is entitled "Digestion of Total Recoverable or Dissolved Metals For Analysis By Flame Atomic Absorption Spectroscopy or Inductively Coupled Plasma Spectroscopy" and includes instructions for quality control, sample preparation and analysis of samples by AA-Flame.

The study design was based upon Youden's non-replicate plan for collaborative tests of analytical methods (1). Each water type was spiked with six concentrations (as three Youden pairs) of the twenty-one test elements and was digested using a nitric/hydrochloric acid procedure and analyzed by flame atomic absorption spectroscopy. Test data from three spiked ground water sources were compared against reagent water as a control. The resulting data were analyzed using USEPA's computer programs entitled "Interlaboratory Method Validation Study" (IMVS). (2). This study produced, for each element, measures of precision and mean recovery for the acid digestion/flame atomic absorption spectroscopy and compared the performance of the method between each water type and reagent water.

This study was conducted by The Bionetics Corporation at the direction of the Environmental Protection Agency, Quality Assurance Branch, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio under EPA Contract No. 68-03-3254. This report covers a period from September 10, 1986 to December 21, 1987. Analytical work was completed as of September, 1987.

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SECTION 1

INTRODUCTION

The Hazardous Waste Management facility permit regulations were promulgated in July, 1982 (40 CFR 265) and provide performance standards for the monitoring of ground waters at hazardous waste sites. To facilitate these standards, certain analytical methodology will be required to assess the degree of ground water contamination at and around the area of the site. Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, (SW-846), September 1986, Third Edition, is intended to provide a unified, up-to-date source of information on sampling and analyses related to compliance with Resource Conservation and Recovery Act (RCRA) regulations. The success of these pollution control activities, particularly when legal action is involved, depends upon the reliability of the data provided by the laboratories. Therefore it was necessary to determine the recovery and precision of the methodology in interlaboratory method validation studies.

EMSL-Cincinnati of the USEPA develops/selects analytical methods and provides quality assurance (QA) support to the Office of Solid Waste (SW) as required by regulations. The QA program is designed to maximize the reliability and legal defensibility of water quality information collected by the Agency, the primary regulating authorities in the states, and by the private sector and commercial laboratories performing compliance analyses. The responsibility for providing QA Support is assigned to the QA Branch of EMSL-Cincinnati. One QA activity is to conduct interlaboratory method validation studies to obtain precision and recovery statements for the Agency's operating program such as the Office of Solid Waste.

This report describes an interlaboratory method validation study on Method 3005 entitled "Acid Digestion of Total Recoverable Metals or Dissolved Metals for Analyses by Flame Atomic Absorption Spectroscopy or Inductively Coupled Plasma Spectroscopy". In this study 21 trace metals were investigated using the total recoverable digestion procedure with flame atomic absorption spectroscopy. Nine commercial laboratories were selected by the Quality Assurance Branch of EMSL-Cincinnati to participate in this study based on technical criteria. The Bionetics Corporation, as primary contractor to the Quality Assurance Branch of EMSL-Cincinnati, was responsible for the collection and characterization of three ground waters for use as test waters in the study and for the subsequent spiking levels of the analytes. Additional Bionetics activities included analyses of the samples to confirm the true concentrations, preparation of user instructions and report forms, preparation and distribution of the samples, screening of returned data for gross errors, and drafting of the final report. The raw data were evaluated statistically by the Quality Assurance Branch of EMSL-Cincinnati using a series of computer programs entitled "Interlaboratory Method Validation Studies" (IMVS).

SECTION 2

CONCLUSIONS

The primary objective of this study was to characterize the performance of Method 3005 in terms of mean recovery, overall precision, single-analyst precision, and the effect of water types on mean recovery and precision. Through the IMVS series of computer programs, statistical analyses of 6804 analytical values provided estimates of mean recovery and precision expressed as regression equations. The mean recovery equation was calculated by regressing mean recovery against true concentration. The precision equations were calculated by regressing standard deviation against mean recovery. One set of regression equations was calculated for each element in each of four water matrices. The linear regression equations approximating these relationships are presented in Table 1. These equations may be used to predict the mean recovery and precision of the elements studied at concentrations within the ranges tested in this study.

The IMVS program rejected 20.6% of 6804 data points submitted. The percentage of rejected data did not vary significantly between water types, ranging from 18% for reagent water 1 to 25% for background water 3. By element, molybdenum had the fewest rejected data, 7%, and copper had the most, 31%. Three of the nine laboratories participating in the study, accounted for 56% of all rejected data. The other six laboratories, each had 5% to 9% of the rejected data.

The mean recovery across the three water types studied ranged from 91% to 108% with two exceptions. Barium showed significant negative mean recoveries from ground water 1 and ground water 3 thus reducing its average percent recovery. Except for these two waters barium recovery was 98%.

Table 1

ENVIRONMENTAL MONITORING AND SUPPORT LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL PROTECTION AGENCY

STUDY 35, SW 846 METHOD 3005, TRACE METALS, AA FLAME

WEIGHTED LINEAR REGRESSION EQUATIONS FOR MEAN RECOVERY AND PRECISION (IN MG/L)

WATER TYPE	ALUMINUM, AL	BARIUM, BA	BERYLLIUM, BE	CALCIUM, CA
APPLICABLE CONC. RANGE	(5.00 - 50.00)	(1.05 - 20.90)	(0.04 - 2.00)	(90.00 - 300.00)
REAGENT WATER 1				
SINGLE-ANALYST PRECISION	SR = 0.056X - 0.18	SR = 0.050X + 0.02	SR = 0.038X + 0.00	SR = 0.022X + 1.96
OVERALL PRECISION	S = 0.082X - 0.13	S = 0.121X - 0.07	S = 0.066X + 0.00	S = 0.110X - 2.02
MEAN RECOVERY	X = 0.899C + 0.11	X = 0.967C - 0.02	X = 0.956C - 0.00	X = 0.905C +12.12
GROUND WATER 1				
SINGLE-ANALYST PRECISION	SR = 0.030X + 0.03	SR = 0.085X + 0.01	SR = 0.019X + 0.00	SR =-0.002X + 6.26
OVERALL PRECISION	S = 0.068X - 0.05	S = 0.171X - 0.00	S = 0.045X + 0.00	S = 0.172X - 5.47
MEAN RECOVERY	X = 0.918C + 0.18	X = 0.675C + 0.42	X = 0.961C + 0.00	X = 0.998C - 0.43
APPLICABLE CONC. RANGE	(5.00 - 50.00)	(1.05 - 21.00)	(0.04 - 2.00)	(24.00 - 75.00)
REAGENT WATER 2				
SINGLE-ANALYST PRECISION	SR = 0.030X + 0.00	SR = 0.071X - 0.02	SR = 0.013X + 0.00	SR = 0.186X - 3.89
OVERALL PRECISION	S = 0.073X - 0.05	S = 0.074X + 0.06	S = 0.026X + 0.01	S = 0.155X - 1.83
MEAN RECOVERY	X = 0.955C - 0.12	X = 0.926C - 0.06	X = 0.966C - 0.01	X = 0.951C + 0.28
GROUND WATER 2				
SINGLE-ANALYST PRECISION	SR = 0.039X - 0.14	SR = 0.044X - 0.01	SR = 0.009X + 0.00	SR = 0.029X + 0.01
OVERALL PRECISION	S = 0.085X + 0.02	S = 0.062X + 0.02	S = 0.031X + 0.00	S = 0.045X + 1.86
MEAN RECOVERY	X = 0.941C - 0.16	X = 0.931C - 0.04	X = 0.961C + 0.00	X = 0.997C + 0.93
APPLICABLE CONC. RANGE	(5.00 - 50.00)	(1.05 - 21.00)	(0.04 - 2.00)	(6.00 - 27.00)
REAGENT WATER 3				
SINGLE-ANALYST PRECISION	SR = 0.046X + 0.03	SR = 0.034X + 0.09	SR = 0.012X + 0.00	SR = 0.143X - 0.98
OVERALL PRECISION	S = 0.090X + 0.04	S = 0.119X - 0.03	S = 0.032X + 0.01	S = 0.282X - 1.47
MEAN RECOVERY	X = 1.007C - 0.32	X = 1.078C - 0.12	X = 0.986C - 0.00	X = 0.878C + 0.43
GROUND WATER 3				
SINGLE-ANALYST PRECISION	SR = 0.027X + 0.11	SR = 0.146X - 0.06	SR = 0.014X + 0.00	SR = 0.049X + 0.23
OVERALL PRECISION	S = 0.092X - 0.17	S = 0.214X + 0.06	S = 0.037X + 0.01	S = 0.368X - 0.04
MEAN RECOVERY	X = 0.998C - 0.25	X = 0.498C + 0.50	X = 0.984C - 0.00	X = 0.866C - 0.80

X = MEAN RECOVERY
C = TRUE VALUE FOR THE CONCENTRATION

Table 1 (continued)

ENVIRONMENTAL MONITORING AND SUPPORT LABORATORY
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STUDY 35, SW 846 METHOD 3005, TRACE METALS, AA FLAME

WEIGHTED LINEAR REGRESSION EQUATIONS FOR MEAN RECOVERY AND PRECISION (IN MG/L)

WATER TYPE	CADMIUM, CD	COBALT, CO	CHROMIUM, CR	COPPER, CU
APPLICABLE CONC. RANGE	(0.04 - 1.86)	(0.96 - 6.00)	(0.44 - 10.50)	(0.15 - 5.00)
REAGENT WATER 1				
SINGLE-ANALYST PRECISION	SR =-0.003X + 0.02	SR = 0.003X + 0.04	SR = 0.029X + 0.02	SR = 0.004X + 0.01
OVERALL PRECISION	S = 0.027X + 0.01	S = 0.021X + 0.02	S = 0.087X + 0.01	S = 0.028X + 0.00
MEAN RECOVERY	X = 1.007C + 0.00	X = 1.017C - 0.00	X = 1.064C + 0.01	X = 0.974C + 0.01
GROUND WATER 1				
SINGLE-ANALYST PRECISION	SR = 0.019X + 0.00	SR = 0.016X + 0.05	SR = 0.045X + 0.01	SR = 0.019X + 0.00
OVERALL PRECISION	S = 0.027X + 0.01	S = 0.061X - 0.03	S = 0.095X + 0.00	S = 0.026X + 0.01
MEAN RECOVERY	X = 0.986C + 0.00	X = 1.084C - 0.06	X = 1.067C - 0.02	X = 0.970C + 0.01
APPLICABLE CONC. RANGE	(0.04 - 1.86)	(0.36 - 6.00)	(0.44 - 10.50)	(0.15 - 5.00)
REAGENT WATER 2				
SINGLE-ANALYST PRECISION	SR = 0.013X + 0.01	SR = 0.023X + 0.01	SR = 0.010X + 0.00	SR = 0.010X + 0.00
OVERALL PRECISION	S = 0.015X + 0.01	S = 0.053X - 0.01	S = 0.040X + 0.02	S = 0.016X + 0.00
MEAN RECOVERY	X = 0.995C - 0.00	X = 1.017C - 0.00	X = 1.065C - 0.01	X = 0.982C - 0.00
GROUND WATER 2				
SINGLE-ANALYST PRECISION	SR = 0.016X + 0.00	SR = 0.011X + 0.01	SR = 0.027X + 0.01	SR = 0.012X + 0.00
OVERALL PRECISION	S = 0.027X + 0.01	S = 0.045X - 0.01	S = 0.136X - 0.03	S = 0.023X + 0.01
MEAN RECOVERY	X = 1.007C - 0.00	X = 0.988C + 0.01	X = 1.057C + 0.01	X = 0.969C - 0.00
APPLICABLE CONC. RANGE	(0.04 - 1.86)	(12.00 - 60.00)	(13.10 - 43.80)	(0.15 - 5.00)
REAGENT WATER 3				
SINGLE-ANALYST PRECISION	SR = 0.014X + 0.00	SR = 0.025X + 0.19	SR = 0.018X + 0.30	SR = 0.004X + 0.01
OVERALL PRECISION	S = 0.038X + 0.00	S = 0.056X + 0.11	S =-0.004X + 1.27	S = 0.023X + 0.00
MEAN RECOVERY	X = 0.991C - 0.00	X = 1.040C - 0.13	X = 1.038C + 1.31	X = 0.983C + 0.01
GROUND WATER 3				
SINGLE-ANALYST PRECISION	SR = 0.012X + 0.00	SR = 0.032X + 0.19	SR = 0.020X + 0.78	SR = 0.012X + 0.01
OVERALL PRECISION	S = 0.051X + 0.00	S = 0.056X + 0.01	S =-0.013X + 2.66	S = 0.037X + 0.01
MEAN RECOVERY	X = 0.978C - 0.00	X = 1.062C + 1.06	X = 1.107C - 0.01	X = 0.992C + 0.00

X = MEAN RECOVERY
C = TRUE VALUE FOR THE CONCENTRATION

Table 1 (continued)

ENVIRONMENTAL MONITORING AND SUPPORT LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL PROTECTION AGENCY

STUDY 35, SW 846 METHOD 3005, TRACE METALS, AA FLAME

WEIGHTED LINEAR REGRESSION EQUATIONS FOR MEAN RECOVERY AND PRECISION (IN MG/L)

WATER TYPE	IRON, FE	POTASSIUM, K	MAGNESIUM, MG	MANGANESE, MN
APPLICABLE CONC. RANGE	(2.70 - 11.30)	(7.00 - 34.50)	(30.00 - 125.00)	(0.09 - 3.35)
REAGENT WATER 1				
SINGLE-ANALYST PRECISION	SR = 0.028X + 0.04	SR = 0.049X - 0.16	SR = 0.000X + 1.51	SR = 0.008X + 0.01
OVERALL PRECISION	S = 0.057X - 0.05	S = 0.103X - 0.24	S = 0.052X + 1.03	S = 0.052X + 0.02
MEAN RECOVERY	X = 0.958C - 0.03	X = 1.060C - 0.56	X = 0.960C + 1.61	X = 0.983C + 0.00
GROUND WATER 1				
SINGLE-ANALYST PRECISION	SR = 0.033X - 0.01	SR = 0.118X - 0.13	SR = 0.018X + 0.62	SR = 0.030X + 0.00
OVERALL PRECISION	S = 0.083X - 0.15	S = 0.132X - 0.09	S = 0.147X - 1.45	S = 0.054X + 0.00
MEAN RECOVERY	X = 0.992C + 0.21	X = 1.091C - 0.79	X = 0.902C + 1.22	X = 1.002C + 0.00
APPLICABLE CONC. RANGE	(6.75 - 22.50)	(0.33 - 14.20)	(4.50 - 30.00)	(1.12 - 3.90)
REAGENT WATER 2				
SINGLE-ANALYST PRECISION	SR = 0.017X + 0.11	SR = 0.060X + 0.01	SR = 0.019X + 0.04	SR = 0.087X - 0.08
OVERALL PRECISION	S = 0.044X + 0.13	S = 0.069X + 0.06	S = 0.030X + 0.12	S = 0.083X - 0.05
MEAN RECOVERY	X = 0.949C + 0.65	X = 1.042C - 0.07	X = 0.855C + 2.29	X = 1.018C - 0.01
GROUND WATER 2				
SINGLE-ANALYST PRECISION	SR = 0.035X + 0.01	SR = 0.051X + 0.04	SR = 0.017X + 0.11	SR = 0.071X - 0.03
OVERALL PRECISION	S = 0.110X - 0.29	S = 0.095X - 0.00	S = 0.050X - 0.04	S = 0.064X - 0.00
MEAN RECOVERY	X = 0.964C - 0.03	X = 0.987C - 0.01	X = 0.859C + 1.87	X = 0.992C - 0.01
APPLICABLE CONC. RANGE	(2.70 - 11.30)	(0.33 - 14.20)	(5.00 - 30.00)	(0.08 - 3.35)
REAGENT WATER 3				
SINGLE-ANALYST PRECISION	SR = 0.013X + 0.08	SR = 0.040X + 0.03	SR = 0.022X + 0.01	SR = 0.006X + 0.02
OVERALL PRECISION	S = 0.065X - 0.04	S = 0.073X + 0.08	S = 0.070X - 0.22	S = 0.060X + 0.02
MEAN RECOVERY	X = 0.935C + 0.03	X = 1.138C - 0.08	X = 0.957C + 0.29	X = 1.010C + 0.01
GROUND WATER 3				
SINGLE-ANALYST PRECISION	SR = 0.048X - 0.06	SR = 0.049X + 0.06	SR = 0.053X + 0.24	SR = 0.015X + 0.01
OVERALL PRECISION	S = 0.043X + 0.19	S = 0.071X + 0.05	S = 0.103X - 0.04	S = 0.051X + 0.01
MEAN RECOVERY	X = 0.969C - 0.37	X = 1.189C - 0.05	X = 0.923C + 0.23	X = 1.010C - 0.01

X = MEAN RECOVERY
C = TRUE VALUE FOR THE CONCENTRATION

Table 1 (continued)

ENVIRONMENTAL MONITORING AND SUPPORT LABORATORY
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STUDY 35, SW 846 METHOD 3005, TRACE METALS, AA FLAME

WEIGHTED LINEAR REGRESSION EQUATIONS FOR MEAN RECOVERY AND PRECISION (IN MG/L)

WATER TYPE	MOLYBDENUM, MO	SODIUM, NA	NICKEL, NI	LEAD, PB
APPLICABLE CONC. RANGE	(0.75 - 37.50)	(27.50 - 110.00)	(0.25 - 5.50)	(0.75 - 18.80)
REAGENT WATER 1				
SINGLE-ANALYST PRECISION	SR = 0.055X + 0.04	SR = 0.070X - 2.03	SR = 0.022X + 0.01	SR = 0.040X + 0.01
OVERALL PRECISION	S = 0.223X + 0.05	S = 0.042X - 0.10	S = 0.025X + 0.01	S = 0.046X + 0.05
MEAN RECOVERY	X = 0.951C - 0.02	X = 0.960C + 0.85	X = 1.002C - 0.00	X = 1.037C + 0.00
GROUND WATER 1				
SINGLE-ANALYST PRECISION	SR = 0.053X + 0.06	SR = 0.015X + 0.90	SR = 0.026X + 0.00	SR = 0.030X + 0.01
OVERALL PRECISION	S = 0.192X + 0.03	S = 0.025X + 1.43	S = 0.024X + 0.05	S = 0.054X - 0.01
MEAN RECOVERY	X = 0.967C + 0.04	X = 0.955C - 0.63	X = 0.993C - 0.01	X = 0.949C + 0.12
APPLICABLE CONC. RANGE	(0.75 - 37.50)	(11.00 - 41.30)	(0.25 - 5.50)	(0.75 - 18.80)
REAGENT WATER 2				
SINGLE-ANALYST PRECISION	SR = 0.032X + 0.01	SR = 0.001X + 0.34	SR = 0.013X + 0.03	SR = 0.025X + 0.04
OVERALL PRECISION	S = 0.138X - 0.02	S = 0.045X - 0.16	S = 0.050X + 0.03	S = 0.043X + 0.02
MEAN RECOVERY	X = 1.009C - 0.03	X = 1.007C - 0.82	X = 1.011C - 0.02	X = 1.024C + 0.02
GROUND WATER 2				
SINGLE-ANALYST PRECISION	SR = 0.036X + 0.02	SR = 0.019X - 0.01	SR = 0.012X + 0.04	SR = 0.027X - 0.01
OVERALL PRECISION	S = 0.160X - 0.05	S = 0.045X + 0.06	S = 0.036X + 0.06	S = 0.038X + 0.05
MEAN RECOVERY	X = 1.004C + 0.06	X = 0.941C + 0.41	X = 1.008C - 0.04	X = 1.010C + 0.04
APPLICABLE CONC. RANGE	(0.75 - 37.50)	(550.00 - 2750.00)	(4.50 - 27.50)	(0.75 - 18.80)
REAGENT WATER 3				
SINGLE-ANALYST PRECISION	SR = 0.030X + 0.04	SR = 0.055X - 8.96	SR = 0.017X + 0.11	SR = 0.013X + 0.07
OVERALL PRECISION	S = 0.104X + 0.03	S = 0.042X + 0.61	S = 0.043X + 0.00	S = 0.022X + 0.13
MEAN RECOVERY	X = 1.146C - 0.08	X = 0.982C +17.94	X = 0.992C + 0.01	X = 1.034C + 0.01
GROUND WATER 3				
SINGLE-ANALYST PRECISION	SR = 0.026X + 0.03	SR = 0.020X X09.76	SR = 0.034X - 0.00	SR = 0.045X + 0.03
OVERALL PRECISION	S = 0.118X - 0.03	S = 0.125X - 0.47	S = 0.107X - 0.34	S = 0.072X - 0.01
MEAN RECOVERY	X = 1.130C + 0.00	X = 1.057C -13.96	X = 0.975C + 0.06	X = 0.811C + 0.11

X = MEAN RECOVERY
C = TRUE VALUE FOR THE CONCENTRATION

Table 1 (continued)

ENVIRONMENTAL MONITORING AND SUPPORT LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL PROTECTION AGENCY

STUDY 35, SW 846 METHOD 3005, TRACE METALS, AA FLAME

WEIGHTED LINEAR REGRESSION EQUATIONS FOR MEAN RECOVERY AND PRECISION (IN MG/L)

WATER TYPE	ANTIMONY, SB	VANADIUM, V	ZINC, ZN
APPLICABLE CONC. RANGE	(0.75 - 37.50)	(1.88 - 93.80)	(0.05 - 1.13)
REAGENT WATER 1			
SINGLE-ANALYST PRECISION	SR = 0.012X + 0.04	SR = 0.047X + 0.04	SR = 0.023X + 0.00
OVERALL PRECISION	S = 0.042X + 0.19	S = 0.121X - 0.09	S = 0.018X + 0.01
MEAN RECOVERY	X = 1.039C + 0.16	X = 1.051C - 0.16	X = 0.979C + 0.00
GROUND WATER 1			
SINGLE-ANALYST PRECISION	SR = 0.032X + 0.03	SR = 0.024X + 0.08	SR = 0.020X + 0.00
OVERALL PRECISION	S = 0.045X + 0.14	S = 0.123X + 0.17	S = 0.042X + 0.01
MEAN RECOVERY	X = 1.056C + 0.09	X = 1.092C - 0.08	X = 0.975C + 0.00
APPLICABLE CONC. RANGE	(0.75 - 37.50)	(1.88 - 93.80)	(0.05 - 1.13)
REAGENT WATER 2			
SINGLE-ANALYST PRECISION	SR = 0.031X + 0.08	SR = 0.035X + 0.06	SR = 0.002X + 0.01
OVERALL PRECISION	S = 0.046X + 0.06	S = 0.082X + 0.11	S = 0.013X + 0.01
MEAN RECOVERY	X = 1.049C + 0.05	X = 1.045C - 0.04	X = 0.985C - 0.00
GROUND WATER 2			
SINGLE-ANALYST PRECISION	SR = 0.005X + 0.13	SR = 0.040X + 0.02	SR = 0.039X + 0.00
OVERALL PRECISION	S = 0.049X + 0.15	S = 0.107X - 0.03	S = 0.053X + 0.01
MEAN RECOVERY	X = 1.022C - 0.03	X = 1.050C - 0.12	X = 0.950C + 0.01
APPLICABLE CONC. RANGE	(0.75 - 37.50)	(1.88 - 93.80)	(0.22 - 1.13)
REAGENT WATER 3			
SINGLE-ANALYST PRECISION	SR = 0.022X + 0.08	SR = 0.063X - 0.07	SR = 0.004X + 0.01
OVERALL PRECISION	S = 0.038X + 0.06	S = 0.104X - 0.17	S = 0.013X + 0.01
MEAN RECOVERY	X = 1.050C + 0.02	X = 1.091C - 0.08	X = 0.962C + 0.01
GROUND WATER 3			
SINGLE-ANALYST PRECISION	SR = 0.008X + 0.14	SR = 0.020X + 0.12	SR = 0.005X + 0.01
OVERALL PRECISION	S = 0.031X + 0.13	S = 0.115X - 0.04	S = 0.007X + 0.01
MEAN RECOVERY	X = 1.031C - 0.02	X = 1.091C - 0.10	X = 0.966C + 0.01

X = MEAN RECOVERY
C = TRUE VALUE FOR THE CONCENTRATION

Table 1 (continued)

ENVIRONMENTAL MONITORING AND SUPPORT LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL PROTECTION AGENCY

STUDY 35, SW 846 METHOD 3005, TRACE METALS, AA FLAME

WEIGHTED LINEAR REGRESSION EQUATIONS FOR MEAN RECOVERY AND PRECISION (IN MG/L)

WATER TYPE	SILVER, AG	THALLIUM, TL
APPLICABLE CONC. RANGE	(0.09 - 4.13)	(0.94 - 20.70)
REAGENT WATER 4		
SINGLE-ANALYST PRECISION	SR = 0.213X - 0.00	SR = 0.038X + 0.01
OVERALL PRECISION	S = 0.418X - 0.02	S = 0.054X + 0.08
MEAN RECOVERY	X = 0.578C + 0.04	X = 0.945C + 0.04
GROUND WATER 1		
SINGLE-ANALYST PRECISION	SR = 0.360X - 0.00	SR = 0.020X + 0.07
OVERALL PRECISION	S = 0.415X - 0.00	S = 0.063X + 0.01
MEAN RECOVERY	X = 0.584C + 0.03	X = 0.987C + 0.07
GROUND WATER 2		
SINGLE-ANALYST PRECISION	SR = 0.167X - 0.01	SR = 0.031X + 0.07
OVERALL PRECISION	S = 0.247X - 0.01	S = 0.087X - 0.01
MEAN RECOVERY	X = 0.696C + 0.02	X = 0.960C + 0.09
GROUND WATER 3		
SINGLE-ANALYST PRECISION	SR = 0.143X - 0.00	SR = 0.009X + 0.12
OVERALL PRECISION	S = 0.279X - 0.01	S = 0.041X + 0.07
MEAN RECOVERY	X = 0.729C + 0.02	X = 1.000C + 0.07

X = MEAN RECOVERY
C = TRUE VALUE FOR THE CONCENTRATION

The recovery regression equation for silver, using all the Youden pairs, indicates an average poor recovery of 65% across all water types. The poor silver data are attributed to the high level spike (approximately 4 mg/L) which exceeds the silver solubility of the acid mixture used in the method. The average mean recovery at the high level spikes was 53%. The average mean recovery of silver for the low and middle Youden pairs across all water types was 85%.

The overall standard deviation expressed as the percent relative standard deviation (%RSD) averaged across the waters studied, ranged from 2% to 19%. The only exception was silver with a %RSD of 34%.

The single-analyst standard deviation expressed as the percent relative standard deviation (%RSD-SA), averaged across all water types, ranged from 1% to 7%. Silver was again the only exception at 22% and ranged from 14% to 36%.

Statistical comparisons were performed on all analytes to determine if there were effects due to water type. Statistically significant effects were found for barium, beryllium, cobalt, chromium, iron, potassium, magnesium, manganese, molybdenum, sodium, nickel, lead, antimony, thallium, and zinc; however, the effect was not considered of practical importance for beryllium, chromium, potassium, magnesium, manganese, molybdenum, sodium, nickel, antimony, thallium, and zinc, with only barium, cobalt, iron, and lead having any practical matrix effect (see "Treatment of Data" section for details).

Interlaboratory method detection limits (MDLs) were determined for twenty-one trace elements. Comparison with MDLs specified in SW-846 show close agreement for barium, beryllium, magnesium, vanadium, cadmium, chromium, manganese, nickel, molybdenum, silver and zinc. Elements exhibiting greater MDLs than those in SW-846 methods were aluminum, calcium, iron, sodium, antimony and thallium. Elements exhibiting MDLs less than those in SW-846 methods were potassium, cobalt, copper and lead.

The SW-846 methods specify optimum concentration ranges for trace metal analyses which usually begin at 10x method detection limits (MDLs). A pair of spiked samples were included in this study to obtain overall and single-analyst precision data at approximately 5x MDL. The percent overall Relative Standard Deviation (%RSD) of the 10x MDL samples averaged 16.0% for all elements compared to 22.7% for the 5x MDL level. The single-analyst %RSD for the 10x MDL samples averaged 9.1% for all elements compared to 11.2% for the 5x MDL level.

SECTION 3

RECOMMENDATIONS

Method 3005 is recommended for the analysis of all specified elements from ground water matrices, except for silver. The linear regression equations obtained from this study can be used to predict the precision and mean recovery of the covered elements at concentrations in the ranges investigated in this study.

For silver, the mean recovery of each of the three Youden pairs decreased significantly with increased concentration in the range studied (0.1 - 4.0 mg/L). The digestion procedure in SW-846 Method 3005 employs hydrochloric acid and it was evident that precipitation occurs at the high concentration levels. Further studies should be conducted to define this critical point and then revise the optimum range for this method or change the acid mixture used in the digestion procedure.

SECTION 4

DESCRIPTION OF STUDY

ANALYTICAL METHODOLOGY

Twenty-one elements were anlyzed by SW-846 method 3005, "Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by Flame Atomic Absorption Spectroscopy or Inductively Coupled Plasma Spectroscopy." The method consists of acidifying a 100 mL sample with 2 mL of concentrated nitric acid and 5 mL of concentrated hydrochloric acid. The sample was then heated to about 90^{o}C in a hood until the volume has been reduced to 15-20 mL. It is then filtered to remove insoluble materials, the volume adjusted to 100 mL and analyzed for metals by flame atomic absorption spectroscopy. The method is applicable to the following elements:

Aluminum	Chromium	Nickel
Antimony	Cobalt	Potassium
Arsenic	Copper	Selenium
Barium	Iron	Silver
Beryllium	Lead	Sodium
Cadmium	Magnesium	Thallium
Calcium	Manganese	Vanadium
	Molybdenum	Zinc

Arsenic and selenium were not tested in this study because these two elements are not recommended for analysis by flame atomic absorption spectroscopy. Either furnace technique atomic absorption or ICP analysis are recommended for arsenic and selenium analyses.

SELECTION OF PARTICIPANTS

Twenty-four commercial laboratories responded to an abstract in the Commerce Business Daily for participants in a method validation study. Technical proposals were evaluated based upon laboratory experience and quality control within the laboratory and those laboratories whose proposals were acceptable were further evaluated based on their performance on preaward trace metal samples. The final participants selected for the formal study were the top nine laboratories of the preaward performance evaluation study:

The Bionetics Corporation - Hampton, Virginia
J.M. Montgomery Consulting Engineers, Inc.
Spotts, Stevens and McCoy, Inc.
ERCO/ENSECO, Inc.
Thermo Analytical, Inc.
Environmental Monitoring Services, Inc.
Skinner and Sherman, Inc.
Science Applications, International Corp.
PPB Environmental Laboratories, Inc.

SELECTION AND COLLECTION OF WATER SAMPLES

The types of water selected for the IMVS included reagent water as the control, and three unfiltered ground waters from monitoring wells at different hazardous waste sites: a) Chem-Dyne, Hamilton, Ohio, b) Wayne Disposal, Detroit, Michigan, and c) Coshocton Sanitary Landfill, Coshocton, Ohio. The background levels of trace metals analyzed by ICP in filtered and unfiltered samples of the three ground waters are shown in Table 2. It should be noted that the unfiltered Wayne ground water contained significant amounts of calcium, chromium, nickel, and cobalt in the suspended solid fraction. Suspended solids concentrations in the unfiltered Chem-Dyne, Coshocton and Wayne waters were 142 mg/L, 69 mg/L, and 168 mg/L, respectively. These waters are referred to as either background waters or

ground water matrices in this study. Only unfiltered water was used in this IMVS.

DESCRIPTION OF IMVS

The design of the IMVS is based upon Youden's original non-replicate design for collaborative evaluation of analytical methods (1). According to this design, samples are prepared in pairs such that the analyte concentrations of the pairs vary between 5-20% of the mean of the pairs. Youden pairs are prepared at three different concentration levels, for each water, to cover the optimum range of the method specified in the SW-846 methods manual. The primary objective of the study was to establish mathematical relationships which express the precision and mean recovery as a function of mean recovery and true concentration, respectively (3).

A second objective of the study was to determine the method detection limit (MDL) using the statistical procedure of the International Union of Pure and Applied Chemistry (IUPAC)(4). The MDL for each of the elements was obtained by determining the average noise level of response of seven analyses for reagent water digestates which had no detectable background. The mean and standard deviation of the noise level digestate response was calculated. Then, for four separate matrix digestates, a calibration curve was determined using the method of standard additions (5 points) and the MDL calculated using the following relationship:

MDL = KSD/m, where
m = (y-i)/x = slope of calibration curve
x = concentration
y = signal
i = intercept
SD = Standard Deviation of the noise level
K = 3 for MDL

Because the natural ground water matrices contained elements with

TABLE 2

BACKGROUND LEVELS OF TRACE ELEMENTS - ICP ANALYSES (mg/L)

Element		Ground Water 1 Chem Dyne		Ground Water 2 Coshocton		Ground Water 3 Wayne	
		Filt	Unfilt	Filt	Unfilt	Filt	Unfilt
Ag	Silver	--	--	--	--	--	.020
Al	Aluminum	0.059	0.47	--	0.60	0.10	0.70
Ba	Barium	0.048	0.040	0.049	0.058	0.037	0.067
Be	Beryllium	--	--	--	--	--	0.0013
Ca	Calcium	104	137	29.7	30.9	1.72	11.8
Cd	Cadmium	--	--	--	--	--	--
Co	Cobalt	0.96	1.73	--	--	0.66	42.5
Cr	Chromium	0.018	0.24	--	0.017	0.034	19.9
Cu	Copper	--	0.015	--	--	0.015	0.51
Fe	Iron	0.031	3.21	0.026	10.3	0.05	4.2
K	Potassium	8.06	10.8	--	--	--	--
Mg	Magnesium	46.0	53.9	12.5	13.1	1.97	5.27
Mn	Manganese	0.037	0.13	1.37	1.58	0.004	0.11
Mo	Molybdenum	0.031	0.022	0.032	0.027	0.24	0.26
Na	Sodium	44.8	48.9	15.9	15.2	1800*	2200*
Ni	Nickel	0.38	0.53	--	--	0.18	9.61
Pb	Lead	--	--	--	--	0.42	0.94
Sb	Antimony	0.091	0.070	0.15	0.10	0.10	0.079
Tl	Thallium	0.33	0.27	0.55	0.36	0.29	0.13
V	Vanadium	--	0.013	--	--	0.020	0.037
Zn	Zinc	0.068	0.062	0.08	0.076	0.082	0.35

* Beyond linearity

-- Below instrument detection limits

significant background levels, the MDL could not be determined for certain elements as shown in Table 3. These are marked as "NA".

A third objective of the IMVS was to evaluate the capability of participating laboratories to analyze for elements at concentrations between the MDL and the lower limit of the optimum range as specified in the SW-846 methods manual. Therefore, a Youden pair for each element/matrix at a concentration of 5x MDL was incorporated into the study.

SW-846 Method 3005 and the instructions for sample preparation, analyses of method blanks and quality control samples, with acceptance limits, instrumental analyses, order of analyses and data report forms required of participants are shown in Appendix A. Each participant was required to carry a quality control sample through the entire analytical procedure, after every sixth unknown sample, and confirm that the result was within the acceptance limits provided. If not, the problem was to be corrected and the last six samples rerun.

VERIFICATION ANALYSES

To assure that the full volume spiked samples prepared by Bionetics and submitted to participating laboratories were as represented, an independent check was made on all sample groups by USEPA analysts.

TABLE 3

MATRICES IN WHICH MDLs COULD BE DETERMINED

Element	Conc. 1 Ground Water 1	Ground Water 2	Ground Water 3	Reagent Water
Al	*	*	*	*
Ba	*	*	*	*
Be	*	*	*	*
Ca	NA	NA	NA	*
Fe	NA	NA	NA	*
K	NA	*	*	*
Mg	NA	NA	NA	*
Mo	*	*	*	*
Na	NA	NA	NA	*
Sb	*	*	*	*
V	*	*	*	*

Element	Conc. 2 Ground Water 1	Ground Water 2	Ground Water 3	Reagent Water
Ag	*	*	*	*
Cd	*	*	*	*
Co	*	*	NA	*
Cr	*	*	NA	*
Cu	*	*	*	*
Mn	*	NA	*	*
Ni	*	*	NA	*
Pb	*	*	*	*
Tl	*	*	*	*
Zn	*	*	*	*

* = Analyze element in this digested matrix.

NA = Do not analyze in this digested matrix.

SECTION 5

TREATMENT OF DATA

The recovery and precision of Method 3005 for 21 trace elements were determined using statistical techniques which followed ASTM Standard Practice D2777-77 [5]. The statistical analyses were performed using computer programs hereafter referred to as IMVS [2]. These include: tests for the rejection of outliers (laboratories and individual data points), summary statistics by concentration level for mean recovery, overall and single-analyst standard deviations (precision), the linear relationship between true value and mean recovery, the linear relationships between standard deviations and mean recovery, and a test of the effect of water type on recovery and precision [7]. A detailed description of the statistical analytical procedures is presented below.

REJECTION OF OUTLIERS

Spurious data points are always a part of any set of data collected during an interlaboratory test program. It is important to identify and remove these data points because they can result in summary statistics which are not representative of the expected performance. However, some erratic behavior in the data may be directly related to some facet of the method itself. Therefore, spurious data points should not be removed indiscriminately, and any points that are removed should be clearly identified since further investigation of the analytical conditions related to the outliers might be of value. In some cases the data points which are deleted may actually be closer to the true concentration than the retained data. This is not inconsistent since outliers are judged relative to the average value of the data and not with respect to the true concentration. Data rejected as outliers for this study as a result of any of the following

tests for outliers have been identified by the symbol "*" in the raw data tables.

YOUDEN'S LABORATORY RANKING PROCEDURE

In some cases the analytical values reported by a specific laboratory are so consistently high or low that a large systematic error may be attributed to that laboratory. These data are not representative of the method and should be rejected. Youden's [1] ranking test for outlying laboratories was applied separately to data from each of the waters studied. Since two water types were used in this study, the laboratory ranking procedure was applied to the two different subsets of the data at the 5% level of significance.

The Youden laboratory ranking procedure requires a complete set of data from every laboratory within a given water type. Missing data from laboratory "i" for water type "j" were replaced by the following procedure. Letting X_{ijk} denote the reported measurement from laboratory "i" for water type "j" and concentration level C_k, it is assumed that

$$X_{ijk} = \beta_j \cdot C_k^{\gamma_j} \cdot L_i \cdot \varepsilon_{ijk}$$

where β_j and γ_j are fixed parameters which determine the effect of the water type "j"; L_i is the systematic error due to laboratory "i" and ε_{ijk} is the random within laboratory error. Taking natural logarithms, it follows that

$$\ell n\, X_{ijk} = \ell n\, \beta_j + \gamma_j\, \ell n\, C_k + \ell n\, L_i + \ell n\, \varepsilon_{ijk}$$

which is a linear regression model with dependent variable $\ell n\, X_{ijk}$ and independent variable $\ell n\, C_k$. Details and justification for this model are discussed in the section "Comparison of Recovery and Precision Across Water Types".

The natural logarithms of the individual laboratory's data were regressed against the natural logarithms of the true concentration levels for

the six ampuls in each water type. The predicted values $\ell n\ \hat{X}_{ijk}$ were obtained from the regression equation, and the missing values for X_{ijk} were estimated by $\hat{X}_{ijk} = \exp(\ell n\ \hat{X}_{ijk})$, where exp(X) denotes the constant e raised to the power X.

If the ranking test rejected a laboratory of a specific water type, then all of the laboratory's data for that water type were rejected as outliers. The rejected values were excluded from all the remaining analyses. In addition, after completion of the laboratory ranking procedure, the predicted values created to fill in for the missing data were rejected and excluded from further analyses for all laboratories.

TESTS FOR INDIVIDUAL OUTLIERS

The data remaining after the laboratory ranking procedure were grouped by water type. For each water type, the data were broken down into twenty-one subsets (one per compound) defined by the six concentration levels (ampuls) used in the study. For each subset of data, all missing, "less than", zero, and "nondetect" data were rejected. Next, the test for individual outliers of Thompson (6) suggested in the ASTM Standard Practice D2777-77 was applied to the data using a 5% significance level. If an individual data point was rejected based on this test, it was removed from the subset, and the test was repeated using the remaining data in the subset. This process was continued until no additional data could be rejected.

STATISTICAL DATA SUMMARIES

Several summary statistics were calculated using the data remaining for each concentration level after the outlier rejection tests were performed. These summary statistics include: the number of retained data points, the mean recovery, recovery as a percentage of the true concentration, the absolute overall and single-analyst standard deviations, and the relative overall and single-analyst standard deviations as a percentage of the mean

recovery. The basic formulas used to calculate these statistics are presented below where $X_1, X_2, \ldots, X_n$ denote the values of the n retained data points for a specific concentration level.

Mean recovery (X):

$$X = \frac{1}{n} \sum_{i=1}^{n} X_i$$

The usual concentration notation for mean recovery is $\bar{X}$. However, to be consistent with IMVS computer output, the symbol X is used in this report to represent $\bar{X}$.

Recovery as a Percent Relative Error:

$$\% \text{ RE} = \frac{X - \text{True Value}}{\text{True Value}} \quad (100)$$

Overall Standard Deviation:

$$S = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (X_i - X)^2}$$

and

Percent Relative Overall Standard Deviation:

$$\%\text{RSD} = \frac{S}{X} \quad (100)$$

The overall standard deviation, S, indicates the precision associated with measurements generated by a group of laboratories. This represents the broad variation in the data collected in an interlaboratory

study. However, a measure of how well an individual analyst can expect to perform in his own laboratory is another important measure of precision. This single-analyst precision, denoted by SR, was estimated for each Youden pair by

$$SR = \sqrt{\frac{1}{2(m-1)} \sum_{i=1}^{m} (D_i - D)^2}$$

where

m = the number of complete sets of Youden pair observations remaining after outliers have been removed.

D_i = the difference between the observations in the ith Youden pair.

D = average of D_i values.

The percent relative single-analyst standard deviation was calculated by

$$\%RSD\text{-}SA = \frac{SR}{X^*} (100)$$

where X* is the average of the two mean recovery statistics corresponding to the two concentration levels defining the particular Youden pair.

These summary statistics provide detailed information on the recovery and precision of the data obtained for each concentration level. One objective of the statistical analysis of the data is to summarize the information about recovery and precision which is contained in the statistics.

A systematic relationship exists between the mean recovery (X) and the true concentration level (C) of the analyte in the sample. In addition,

there are often systematic relationships between the precision statistics (S and SR) and the mean recovery (X). Usually, these systematic relationships can be adequately approximated by a linear relationship (i.e., by a straight line). Once these straight lines are established, they can be used to conveniently summarize the behavior of the method within a water type, and they can aid in comparing the behavior of the method across water types. In addition, they can be used to obtain estimates of the recovery and precision at any concentration within the applicable range studied. They can also be used to predict the behavior of the method when used under similar conditions. These important relationships are discussed on the following pages.

STATEMENT OF METHOD RECOVERY

The recovery of the method is characterized by the relationship of the mean recovery (X) to the true concentration (C) of the analyte in the water sample. In order to obtain a mathematical expression for this relationship, a regression line of the form

$$X = a + b\,C \qquad (1)$$

was fitted to the data by regression techniques.

The true concentration tested covered a wide range of values. In such cases, the mean recovery statistics at the higher concentrations tend to dominate the fitted regression line producing relatively larger errors in the estimates of mean recovery at the lower concentration. To eliminate this problem, a weighted least squares technique was used to fit the mean recovery data to the true concentration values. The weighted least squares technique was performed by dividing both sides of Equation (1) by C resulting in Equation (2)

$$\frac{X}{C} = a\left(\frac{1}{C}\right) + b \qquad (2)$$

The (X/C) values were regressed against the (1/C) values using ordinary least squares to obtain estimates for the values of a and b. (This is equivalent to performing a weighted least squares with weights $w = 1/C^2$; see Reference [3], page 108 for details.) Equation (2) can easily be converted to the desired relationship given by Equation (1). The intercept (b) from Equation (2) becomes the slope (b) for Equation (1) and slope (a) from equation (2) becomes the intercept (a) for Equation (1). Equation (1) can be used to calculate the percent recovery over the applicable range of concentrations used in the study.

The percent recovery is given by

$$\% \text{ Recovery} = \frac{a + bC}{C}(100) = \left(\frac{a}{C} + b\right) 100 \qquad (3)$$

If the absolute value of the ratio (a/C) is small relative to the slope (b) for concentration in the low end of the range of concentration levels used in the study, then the percent recovery can be approximated by b(100). For example, suppose the true concentration values range from 25 ug/L to 515 ug/L, the fitted line is given by $X = 0.20 + 0.85C$. The percent recovery would be approximated by 0.85 (100) = 85 percent over the specified range of 25 ug/L to 515 ug/L.

If the ratio (a/C) is not small relative to the slope (b), then the percent recovery depends upon the true concentration (C), and it must be evaluated at each concentration value within the specified range.

STATEMENT OF METHOD PRECISION

The precision of the method is characterized by the relationships between precision statistics (S and SR) and mean recovery (X). In order to obtain a mathematical expression for these relationships, regression lines of the form

$$S = d + eX \qquad (4)$$

and

$$SR = f + gX^* \tag{5}$$

were fitted to the data by regression techniques.

As discussed previously with respect to recovery, the values of X and X* often vary over a wide range. In such cases the standard deviation statistics associated with the larger mean recovery values will dominate the regression lines. This will produce relatively larger errors in the estimates of S and SR at the lower mean recovery value. Therefore, a weighted least squares technique was also used to establish the values of the parameters d, e, f and g in Equations (4) and (5). The weighted least squares technique was performed by dividing both sides of Equation (4) by X resulting in Equation (6)

$$\frac{S}{X} = d\left(\frac{1}{X}\right) + e \tag{6}$$

and dividing both sides of Equation (5) by X* resulting in Equation (7)

$$\frac{SR}{X^*} = f\left(\frac{1}{X^*}\right) + g \tag{7}$$

The (S/X) values were regressed against the (1/X) values and the (SR/X^*) values were regressed against the (1/X*) values using ordinary least squares to obtain estimates for the parameters d, e, f and g.

Equations (4) and (5) were obtained from Equations (6) and (7) in a manner similar to that discussed for mean recovery. The slope (d) for Equation (6) is the intercept (d) for Equation (4), and the intercept (e) for Equation (6) is the slope (e) for Equation (4). Similarly, the slope (f) for Equation (7) is the intercept (f) for Equation (5), and the intercept (g) for Equation (7) is the slope (g) for Equation (5).

Given equations (4) and (5), the percent relative overall standard deviation and the percent relative single-analyst standard deviation are;

$$\%RSD = \left(\frac{d}{X} + e \right) (100) \qquad (8)$$

and

$$\%RSD\text{-}SA = \left(\frac{f}{X^*} + g \right) (100) \qquad (9)$$

respectively. If absolute value of the ratio (d/X) is small relative to the slope (e), then the percent relative overall standard deviation can be approximated by (100)e over the applicable range of mean recovery values. Similarly if the ratio (f/X*) is small relative to the slope (g), then the percent relative single-analyst standard deviation can be approximated by (100)g over the applicable range of mean recovery values. If the ratios (d/X) and (f/X*) are not small relative to the slopes (e) and (f), then the percent relative standard deviations depend upon the values of the mean recovery statistics X and X*, and they should be evaluated separately for each value of X and X*.

COMPARISON OF RECOVERY AND PRECISION ACROSS WATER TYPES

It is possible that the recovery and precision of this method validation study depends upon the type of water being analyzed. The summary statistics X, S and SR are calculated separately for each concentration level within each water type. They can be compared across water types in order to obtain information about the effects of water types on recovery and precision. However, the use of these summary statistics in this manner has several disadvantages. First, it is cumbersome since there are 24 mean recovery statistics (X), 24 precision statistics (S) and 12 precision statistics (SR) calculated for each compound and water. Comparison of these statistics across concentration levels and across water types become unwieldy. Second, the statistical properties of this comparison procedure are difficult to

determine. Finally, due to variation associated with X, S and SR, comparisons based on these statistics can lead to inconsistent conclusions about the effect of water type. For example, reagent water may produce a significantly lower value than surface water for the precision statistics S at a high concentration, but a significantly higher value for S at a low concentration.

An alternative approach, described in reference [7], was developed to test for the effects of water type. This alternative approach summarizes the average effect of water type across concentration levels rather than studying the local effects at each concentration level. If significant differences are established by this alternative technique, then the summary statistics can be used for further local analyses.

The test for the effect of water type is based on the following statistical model. If X_{ijk} denotes the measurement reported by laboratory "i", for water type "j", and ampul "k", then;

$$X_{ijk} = \beta_j \cdot C_k^{\gamma_j} \cdot L_i \cdot \varepsilon_{ijk} \qquad \begin{matrix} i = 1,2,\ldots,n \\ j = 1,2,\ldots,n \\ k = 1,2,\ldots,6 \end{matrix} \qquad (10)$$

The model components β_j and γ_j are fixed parameters which determine the effect of water type "j" on the behavior of the observed measurements (X_{ijk}). The parameter C_k is the true concentration level associated with ampul "k". The model component L_i is a random factor which accounts for the systematic error associated with laboratory "i". The model component ε_{ijk} is the random factor which accounts for the within-laboratory error.

The model is designed to approximate the global behavior of the data. The multiplicative structure was chosen because of two important properties. First, it allows for a possible curvilinear relationship between the data (X_{ijk}) and the true concentration level C_k through the use of the exponent γ_j

on C_k. This makes the model more flexible in comparison to straight-line models. Second, as will be seen below, there is an inherent increasing relationship between the variability in the data and the concentration level C_k in this model. This property is important because it is typical of interlaboratory data collected under conditions where the true concentration levels vary widely.

Mean recovery is the expected value of the measurements (X_{ijk}). The expected value for the data modeled by Equation (10) is;

$$E(X_{ijk}) = \beta_j (C_k^{\gamma_j}) E[L_i (\varepsilon_{ijk})] \qquad (11)$$

Precision is related to the variability in the measurements (X_{ijk}). The variance of the data modeled by Equation (10) is

$$Var(X_{ijk}) = [\beta_j (C_k^{\gamma_j})]^2 \ Var[L_i (\varepsilon_{ijk})] \qquad (12)$$

which is an increasing function of C_k.

The effect of water type on the recovery and precision of this IMVS is determined by the values of the parameters β_j and γ_j in Equations (11) and (12). If the β_j and γ_j vary with "j" (i.e. vary across water type), then the recovery and precision of the method also vary across water type.

To determine if these parameters vary across water type and to compare their values, they must be estimated from the laboratory data using regression techniques. Equation (10) represents the basic model. However, taking natural logarithms of both sides of Equation (10), the following straight-line regression model is obtained

$$\ell n\, X_{ijk} = \ell n \beta_j + \gamma_j \ell n\, C_k + \ell n\, L_i + \ell n\, \varepsilon_{ijk} \qquad (13)$$

which can be analyzed using standard linear model analysis techniques. The parameter $\ell n\, \beta_j$ is the intercept and γ_j the slope of the regression line associated with water type "j". It is assumed that $\ell n\, L_i$ is normally distributed with mean 0 and variance, σ^2_L that $\ell n\, \varepsilon_{ijk}$ is normally distributed with mean 0 and variance, σ^2_ε, and that the $(\ell n\, L_i)$ and $(\ell n\, \varepsilon_{ijk})$ terms are independent.

Based on Equation (13) the comparison of water types reduces to the comparison of straight lines. Reagent water is viewed as a control, and each of the remaining lines (for other water types and digestions) is compared directly to the line for reagent water.

Using the data on the log-log scale and regression techniques, the parameters $\ell n\, \beta_j$ (and hence β_j) and γ_j can be estimated. The estimates are then used to test the null hypothesis that there is no effect due to water type. The formal null and alternative statistical hypothesis, H_0 and H_A, are given by

$$H_0: \ell n\, \beta_j - \ell n\, \beta_1 = 0 \quad \text{and} \quad \gamma_j - \gamma_1 = 0 \qquad \text{for } j = 2,3,4$$

versus

$$H_A: \ell n\, \beta_j - \ell n\, \beta_1 \neq 0 \text{ and/or } \gamma_j - \gamma_1 \neq 0 \text{ for some } j = 2,3,4$$

The test of null hypothesis, H_0, against the alternative hypothesis, H_A, is based on an F-statistic derived from standard linear model theory. The probability of obtaining a value of an F-statistic as large as the value which was actually observed (F_{OBS}), denoted by $P(F>F_{OBS})$, is calculated under the assumption that H_0 is true. The null hypothesis H_0 is rejected in favor of H_A if $P(F>F_{OBS})$ is less than 0.05.

If H_0 is rejected, then some linear combination of the differences in $(\ell n\, \beta_j - \ell n\, \beta_1)$ and $(\gamma_j - \gamma_1)$ is statistically different from zero. However, this does not guarantee there will be a statistically significant direct effect attributable to any specific water type since the overall

F-test can be overly sensitive to minor systematic effects common to several water types. The effect due to a specific water type is judged to be statistically significant only if one of the differences ($\ell n\ \beta_j - \ell n\ \beta_1$) and/or ($\gamma_j - \gamma_1$) is statistically different from zero. This is determined by checking the simultaneous 95% confidence intervals which are constructed for each of these differences. Each true difference can be stated to lie within its respective confidence interval with 95% confidence. If zero is contained within the confidence interval then there is no evidence that the corresponding difference is significantly different from zero.

If at least one of the confidence intervals for the differences ($\ell n\ \beta_j - \ell n\ \beta_1$) or ($\gamma_j - \gamma_1$) fails to include zero, then the statistical significance of the effect due to water type has been established. However, establishment of a statistically significant effect due to water type does not necessarily mean that the effect is of practical importance. Practical importance is related to the size and interpretation of the difference.

The interpretation of the differences involves comparing the mean recovery and standard deviation of the (X_{ijk}) data for each water type to the mean recovery and standard deviation obtained for reagent water. These comparisons are made on a relative basis. The mean recovery for water type "j" is given by Equation (11). The mean recovery for water type "j" is compared to that for reagent water (j=1) on a relative basis by

$$\frac{E(X_{ijk})}{E(X_{i1k})} = \frac{\beta_j\ C_k^{\gamma_j}\ E[L_i\ (\varepsilon_{ijk})]}{\beta_1\ C_k^{\gamma_1}\ E[L_i\ (\varepsilon_{i1k})]} = \frac{\beta_j}{\beta_1}\ C_k^{(\gamma_j - \gamma_1)} \qquad (14)$$

(The ratio of the standard deviations would be equivalent to Equation (14) and therefore the interpretation of the effect on precision is the same as that for the effect on mean recovery.)

The ratio in Equation (14) is a measure of the relative difference in mean recovery between water type "j" and reagent water. It is composed of two parts (a) β_j/β_1, which is independent of the true concentration level

(i.e. the constant bias), and (b) $C_k^{(\gamma_j - \gamma_1)}$ which depends upon the true concentration level (i.e. the concentration dependent bias). If $(\gamma_j - \gamma_1)$ is zero, then the relative difference in mean recovery is just β_j/β_1 which is independent of concentration level C_k. It can then be stated that the mean recovery of water type "j" is $100(\beta_j/\beta_1)$ percent of the mean recovery for reagent water. If $(\gamma_j - \gamma_1)$ is not zero, then the mean recovery of water type "j" is $100(\beta_j/\beta_1)\, C_k^{(\gamma_j - \gamma_1)}$ percent of that for reagent water, and therefore depends upon the true concentration level C_k.

In order to illustrate these points consider the following example. Suppose that a significant F-value has been obtained, and the confidence intervals for all the differences contain zero except for water type 5. For water type 5, the point estimate for $\ell n\beta_5 - \ell n\beta_1$ is -0.38 and the confidence interval for $(\ell n\beta_5 - \ell n\beta_1)$ is (-0.69, - 0.07). The point estimate for $(\gamma_5 - \gamma_1)$ is -0.07, and the confidence interval for $\gamma_5 - \gamma_1$ is (-0.04, 0.18). In this case a statistically significant effect due to water type has been established which involves only water type 5. The practical significance of this effect is judged by considering Equation (14). The ratio of mean recoveries for water type 5 and reagent water is given by;

$$\frac{E(X_{i5k})}{E(X_{i1k})} = \frac{\beta_5}{\beta_1} C_k^{(\gamma_5 - \gamma_1)} \qquad (15)$$

and the ratio of the standard deviations is given by

$$\frac{Var(X_{i5k})}{Var(X_{i1k})} = \frac{\beta_5}{\beta_1} C_k^{(\gamma_5 - \gamma_1)} \qquad (16)$$

Since the confidence interval for $(\gamma_5 - \gamma_1)$ contains zero this difference is assumed to be insignificant and is set to zero. Therefore Equations (15) and (16) reduce to β_5/β_1. The point estimate for $(\ell n\ \beta_5 - \ell n\ \beta_1)$ was -0.38.

Therefore, the point estimate for β_5/β_1 is 0.68, and the mean recovery for water type 5 is estimated to be 68% of the mean recovery for reagent water. Similarly the standard deviation for the data for water type 5 is estimated to be 68% of the standard deviation for reagent water. Since the 95% confidence interval for $\ell n\beta_5 - \ell n\beta_1$ was (-0.69, -0.07), any value in the recovery (standard deviation) for water type 5 can be claimed to be from 50% to 93% of the mean recovery (standard deviation) for reagent water. The practical significance of the effect due to water type 5 would depend upon the importance of a mean recovery (standard deviation) observed for reagent water.

SECTION 6

RESULTS AND DISCUSSION

The primary objective of this study was to characterize the performance of Method 3005 in terms of mean recovery, overall precision, single-analyst precision and the effect of background water type on recovery and precision on 21 trace elements in four different water matrices.

Prior to a discussion of the results of the recoveries obtained by each of the laboratories, it is instructive to examine the results of the analyses for background levels of each element in each of the three ground water matrices provided to the participating laboratories. Each participating laboratory calculated the spike concentrations for IMVS processing which resulted from the subtraction of the background concentration found from the total sample concentrations.

The three unspiked ground waters provided were analyzed by the nine participating laboratories and results compared, in Table 4, with those of EMSL-Cincinnati's initial characterization. The EPA-ICP analyses were on the undiluted matrix waters while the matrix water blanks, supplied to the participating laboratories, were at 75% strength. The blanks were diluted to compensate for the spike volume added to each matrix water during sample production. The participant's results were obtained by AA-direct aspiration while EPA's results, corrected for volume difference, were obtained by ICP.

Generally, the background analyses in TABLE 4 are consistent among the participating laboratories with an occasional exception or two. Laboratory 009 has the largest number of exceptions and also accounted for the second highest number of outliers in the 3005 study data.

TABLE 4

GROUND WATER 1 BACKGROUND RESULTS - AAS(mg/L)

Laboratory Code

Metals	001	002	003	004	004	006	007	008	009	EPA-ICP
Ag	0.022	0	0.03	0	0	0	0.01	0	0	0
Al	0.25	0.40	0.53	0	0.321	0.80	0.520	0.48	0.42	0.47
Ba	0	0.056	0	0	0.044	0.86	0	0	0	0.045
Be	0	0	0.03	0	0	0.005	0	0	0.012	0
Ca	109	105	114	11.1	128	110	156	104	10.3	137
Cd	0	0	0.04	0	0	0	0	0	0	0
Co	1.77	1.82	1.66	1.75	1.88	1.68	1.73	1.84	1.74	1.73
Cr	0.39	0.40	0.54	0.45	0.55	0.42	0.36	0.47	0.19	0.24
Cu	0.01	0.021	0.02	0	0	0.016	0.026	0	0	0.015
Fe	2.63	2.66	2.65	2.70	2.65	2.19	2.20	2.92	2.6	3.21
K	9.5	9.11	7.68	7.96	6.80	7.96	7.79	8.33	8.30	10.8
Mg	42.8	44.7	43.3	45.2	47.3	34.6	31.7	40.7	40.5	53.9
Mn	0.11	0.12	0.11	0.12	0.11	0.18	0.11	0.12	0.09	0.13
Mo	0	0	0.09	0	0	0.06	0.050	0	0	0.022
Na	39.3	38.6	36.3	37.2	38.2	36.4	32.5	35.7	7.6	48.9
Ni	0.53	0.53	0.53	0.57	0.51	0.66	0.47	0.52	0	0.53
Pb	0	0	0	0	0	0	0.039	0	0.19	0
Sb	0	0	0.10	0	0.14	0	0	0	0.31	0.070
Tl	0	0	0.09	0	0	0	0.096	0	0	0
V	0	0	0	0	0.018	0.33	0.14	0	0	0.013
Zn	0.016	0.034	0.038	0.070	0.033	0.030	0.038	0.032	0.10	0.062

TABLE 4 (Continued)

GROUND WATER 2 BACKGROUND RESULTS - AAS(mg/L)

	Laboratory Code									
Metals	001	002	003	004	005	006	007	008	009	EPA-ICP
Ag	0	0	0.05	0	0	0	0.01	0	0	0
Al	0.83	1.00	0.44	0.82	0.64	0.87	0.520	0.64	0.82	0.60
Ba	0	0	0.21	0	0.015	0.23	0.038	0.25	0	0.058
Be	0	0	0.03	0	0	0.009	0	0	0.003	0
Ca	0	27.8	24.2	23.1	25.02	24.7	36.9	24.1	21.6	30.9
Cd	0	0	0.03	0	0	0	0	0	0	0
Co	0	0	0.15	0	0	0	0.020	0	0.03	0
Cr	0	0	0	0	0	0	0.028	0	0.17	0.017
Cu	0	0.014	0.03	0	0	0	0.013	0	0	0
Fe	7.52	7.68	7.29	7.49	7.57	6.26	7.27	8.08	8.46	10.3
K	0	1.103	1.21	0.98	0.742	0.85	0.952	0.912	0.97	0
Mg	0	13.6	12.0	12.0	12.1	9.66	9.34	10.9	12.48	13.1
Mn	1.183	1.24	1.13	1.20	1.21	1.18	1.18	1.23	1.227	15.8
Mo	0	0	0	0	0	0.20	0.050	0	0.01	0.027
Na	0	13.7	12.5	11.8	12.0	14.3	11.4	13.4	0.3	15.2
Ni	0.041	0	0.16	0	0.03	0.068	0.029	0	0.03	0
Pb	0	0	0	0	0	0	0.039	0	0.17	0
Sb	0	0	0.14	0	0.078	0.58	0	0	0.34	0.10
Tl	0	0	0	0	0	0	0.096	0	0	0
V	0	0	0	0	0	0	0.143	0	0	0
Zn	0.055	0.030	0.038	0	0.014	0.023	0.038	0.021	0.05	0.076

TABLE 4 (Continued)

GROUND WATER 3 BACKGROUND RESULTS - AAS (mg/L)

	Laboratory Code									
Metals	001	002	003	004	005	006	007	008	009	EPA-ICP
Ag	0.092	0	0	0.04	0	0	0.01	0	0	0
Al	0.53	0.64	0.46	0	0.341	0.73	0.520	0	0.67	0.70
Ba	0	0	0	0	0	0.20	0.0385	0	0.05	0.067
Be	0	0	0.01	0	0	0.006	0	0	0	0.001
Ca	7.7	2.54	5.58	4.48	2.85	2.98	9.41	6.59	6.49	11.8
Cd	0	0	0.01	0	0.016	0	0	0	0	0
Co	18.6	28.2	22.4	23.0	27.3	23.3	22.9	27.5	28.0	42.5
Cr	7.84	12.7	11.8	17.7	13.0	11.9	12.2	15.9	0.03	19.9
Cu	0.28	0.31	0.29	0.28	0.296	0.28	0.30	0.300	0.30	0.51
Fe	2.78	2.38	2.31	2.56	2.43	1.76	1.71	2.77	1.932	4.2
K	1.3	1.18	1.60	1.45	1.28	1.10	1.58	1.06	1.23	0
Mg	3.2	2.76	3.40	3.38	2.55	2.70	2.54	3.01	3.33	5.27
Mn	0.043	0.66	0	0.066	0.056	0.14	0.060	0.063	0.033	0.11
Mo	0.10	0.25	0.28	0	0.013	0.14	0.20	0.23	0.03	0.26
Na	1500	1792	1751	1720	1803	1151	1680	1710	1868	2200
Ni	4.81	5.95	5.37	5.84	5.60	5.47	4.77	5.99	5.92	9.61
Pb	0	0	0	0	0.14	0.059	0	0	0.03	0.94
Sb	0	0	0.24	3.83	0.39	0	0	0	0	0.079
Tl	0	0	0	0	0.08	0	0.19	0	0	0
V	0	0	0.10	0	0	0.50	0.14	0	0	0.037
Zn	0.17	0.17	0.18	0.17	0.18	0.16	0.17	0.17	0.20	0.35

REJECTION OF OUTLIERS

The analytical data, processed through the IMVS program, underwent three outlier tests. First, the Youden's Laboratory Ranking Procedure was used to detect and reject data having a large systematic error associated with a particular laboratory. If the majority of a laboratory's data for a particular element-water combination was either biased high or biased low, compared to the other laboratories, the laboratory would fail the lab ranking procedure and all of that laboratory's data were rejected for that element-water combination. Second, zero, negative and non-detected data were rejected as unusable data. Finally, the Thompson Outlier Test was used to reject individual outliers. All rejected data are identified in Appendix B Raw Data tables by the symbol "*".

Table 5 presents the number of rejected data for each water type by element. The maximum number of data points achievable for each water type is 54 (6 spiked recoveries times 9 laboratories).

For the entire project, the IMVS program rejected 1403 data points of the 6804 data points submitted, or 20.6%. The percentage of rejected data did not vary significantly among water types. The percent of the total rejected data ranged from a low of 14% in reagent water 1 to a high of 25% for ground water 3.

Molybdenum had the lowest number of rejected data with 24 while copper had the highest with 102.

The percentage of data rejected for each laboratory is presented in the Table 6. Of the nine laboratories participating in the study three accounted for 786 or 56% of all rejected data. The other six laboratories ranged from 74 to 130 rejected data points.

TABLE 5

NUMBER OF DATA POINTS REJECTED BY ELEMENT *

Element	Reagent Water 1	Backgrd Water 1	Reagent Water 2	Backgrd Water 2	Reagent Water 3	Backgrd Water 3	Total
Al	18	12	18	12	12	12	84
Ba	14	12	12	14	12	1	65
Be	3	7	6	13	12	6	47
Ca	6	21	6	18	14	18	83
Cd	6	12	13	7	13	20	71
Co	13	19	14	20	18	13	97
Cr	12	13	22	13	13	8	81
Cu	19	13	20	18	18	14	102
Fe	12	12	12	6	19	18	79
K	12	12	7	7	12	19	69
Mg	7	6	12	15	7	13	60
Mn	6	19	12	13	12	14	76
Mo	0	0	6	0	6	12	24
Na	12	7	19	18	7	20	83
Ni	7	12	12	2	1	14	48
Pb	7	9	12	13	8	14	63
Sb	7	12	3	18	12	13	65
V	12	6	18	12	19	18	85
Zn	12	3	8	10	8	13	54
Ag**	0	2	NA	10	NA	4	16
Tl**	13	13	NA	12	NA	13	51
Totals	198	222	232	251	223	277	1403

* The total number of data points for each element-water type is 54 (6 concentrations x 9 labs.)

** Ag and Tl used only one spiked reagent water.

TABLE 6

PERCENTAGE OF DATA REJECTED FOR EACH LABORATORY

Laboratory Code	No. Rejected	% Rejected
001	94	6.7
002	131	9.3
003	90	6.4
004	182	13.0
005	74	5.3
006	369	26.3
007	102	7.3
008	125	8.9
009	236	16.8
	Total 1403	

MEAN RECOVERY

The mean recovery X, of the retained data, was compared to the true values supplied to the IMVS programs for each element at each spike concentration level in each test water. These individual values are presented in Appendix C as 732 separate values. Subjecting these values for each water type to linear regression analysis yielded regression equations where mean recovery, X, was related to the true value, C, over the entire concentration range. Thus, there are 126 mean recovery regressions; one equation for each of 21 elements in each of six water types. These regression equations are in the form,

$$x = mC + b$$

where
- x - the mean recovery of a spiked sample,
- C - the true spike concentration
- m - the slope of the regressed line
- b - the intercept of the regressed line

The slope, m, of these regression equations can be used to estimate the percent recovery of each element as long as the intercept, b, is small, i.e. less than 5% of the value slope times true concentration, mC. Examination of the regression equations presented in Table 1 indicates that this criteria can be met for elements in all water types except calcium, sodium, magnesium, potassium, iron and chromium. For these elements, percent recovery estimates were calculated by inserting a mid-point concentration, from the range studied, for the value C. The X value obtained divided by the mid-point concentration C, times 100 will yield percent recovery. The percent recovery estimates for all elements is presented in Table 7.

The average percent recovery for each element, through all waters, is found in the extreme right hand column. Only two elements, barium and silver, fell outside of the 90%-110% interval.

TABLE 7

PERCENT RECOVERY ESTIMATES

Element	Reagent Water 1	Backgrd Water 1	Reagent Water 2	Backgrd Water 2	Reagent Water 3	Backgrd Water 3	Avg Across Waters
Al	90	92	96	94	101	100	96
Ba	97	67	93	93	108	50	85
Be	96	96	97	96	99	98	97
Ca	103	100	95	100	88	87	94
Cd	101	99	100	101	81	80	94
Co	102	108	102	99	104	106	104
Cr	106	107	107	106	113	111	108
Cu	97	97	98	97	98	99	98
Fe	96	99	103	96	94	97	98
K	106	103	104	99	114	119	108
Mg	96	90	103	101	96	92	96
Mn	98	100	102	99	101	101	100
Mo	95	97	101	100	115	113	104
Na	96	95	101	94	98	106	98
Ni	100	99	101	101	99	98	100
Pb	104	95	102	101	103	81	98
Sb	104	106	105	102	105	103	104
V	105	109	105	105	109	109	107
Zn	98	98	99	95	96	97	97
Ag	58	58	NA*	70	NA	73	65
Tl	94	99	NA	96	NA	100	97
Average	97	96	101	97	101	96	98

* Only one reagent water was used as a control for Ag & Tl.

A closer look at the barium recovery estimates reveals large recovery differences for background water 1 and background water 3. These matrices appeared to have adversely affected the recovery of barium which may be due to elevated sulfate levels. Reagent water recovery for barium was 98%.

Using all Youden pairs, the regression equation for mean recovery for silver indicates an average recovery of 65% across all water types. The poor recovery data are attributed to the high level spikes (approximately 4 mg/L) which exceed the solubility of the acid mixture used in the method. The mean recovery of silver at the high concentration level was 53% across all water types. The mean recovery of the low and middle Youden pairs across all water types was 85%. Hinners [8] has shown in Figure 1 that silver is soluble at a concentration of 0.05 mg/L in a hydrochloric acid/nitric acid mixture, but forms a significant precipitate at 0.5 mg/L. The optimum concentration range specified in USEPA's 3005/AA method is 0.1 to 4.0 mg/L. Further investigation is needed concerning the acid mixture and optimum range of the method.

PRECISION

The overall and single-analyst precision estimates for each element in each water type and at each concentration level resulted in 732 values of overall precision and 366 values of single-analyst precision. These values are presented in Appendix C. Subjecting the individual precision values, within each water type, to linear regression analysis yields regression equations where the precision (S.D.)is related to the mean recovery (X) over the entire concentration range.

$$S.D. = mX \pm b$$

To compare the overall and single-analyst precision, and the % relative standard deviation (%RSD), the mean recovery was calculated by using as the true concentration (C) a mid-point value in the concentration range studied. This calculated mean recovery was inserted into the overall and single-

Figure 1. Stability of Silver Concentrations in 0.12N HCl + 0.16N HNO_3

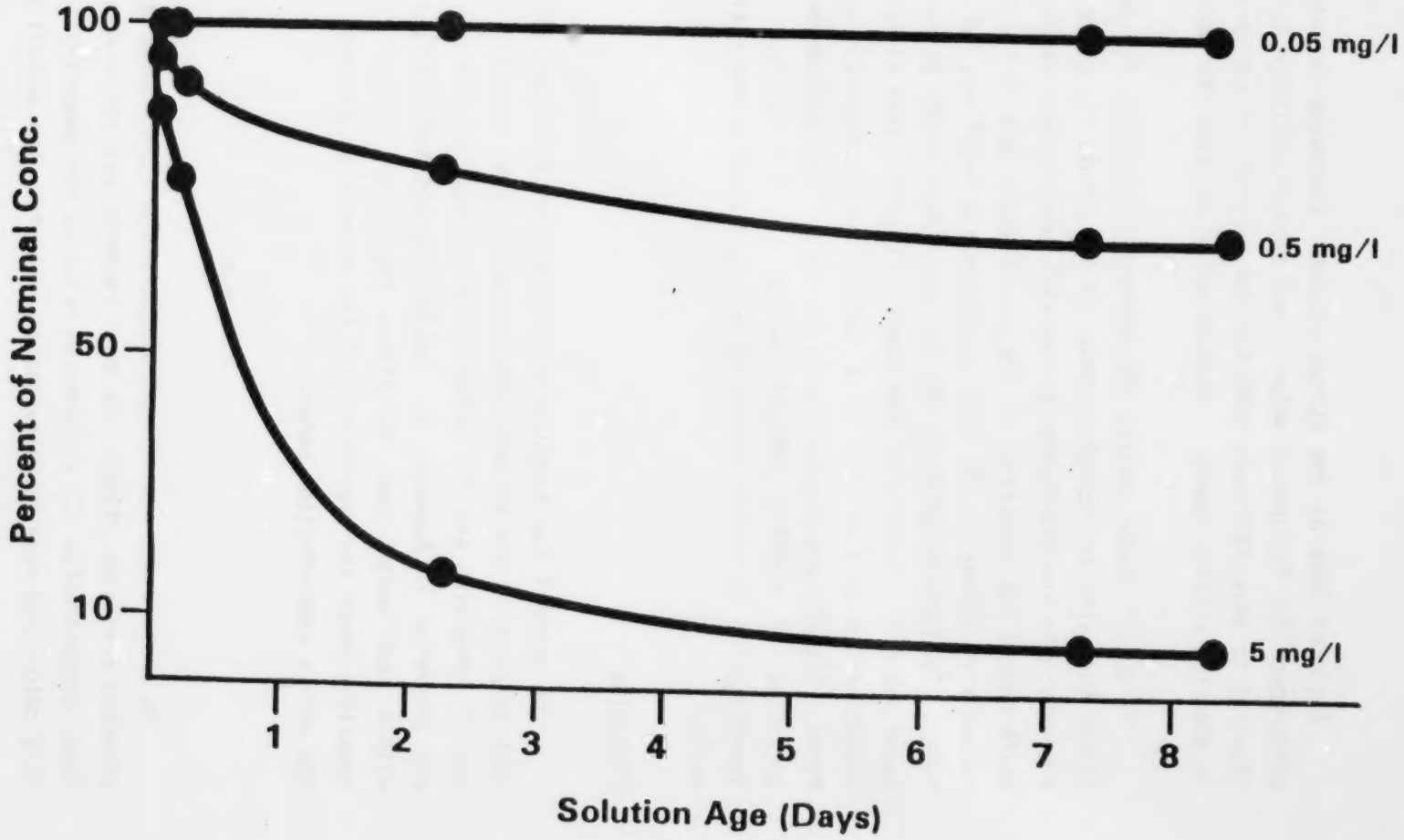
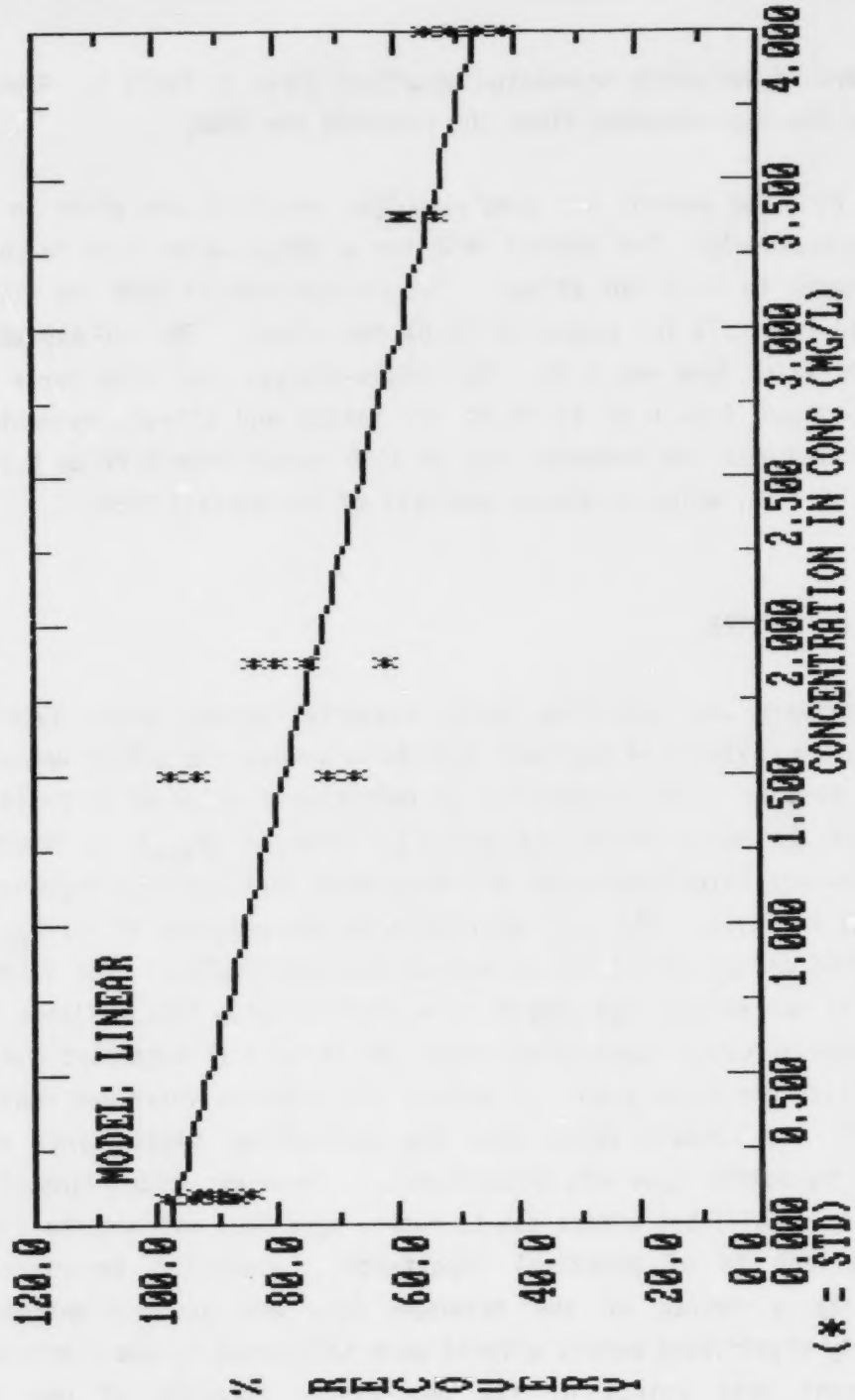


FIGURE 2

SILVER CONCENTRATION VERSUS % RECOVERY



analyst standard deviation regression equations given in Table 1. Subsequent division by the mean recovery times 100 provides the %RSD.

The % RSDs for overall and single-analyst precision are given in Tables 8 and 9, respectively. The overall %RSD for a single water type ranged from 2.0% for copper to 40.3% for silver. The average overall %RSD for all water types ranged from 2.7% for copper to 33.0% for silver. The average %RSD for all elements/water type was 8.5%. The single-analyst (SA) %RSD for a single water type ranged from 0.1% to 36.0% for barium and silver, respectively. For all water types and elements, the SA %RSD ranged from 2.9% to 5.1% with an average of 4.3%, which is almost one-half of the overall %RSD.

EFFECTS OF WATER TYPE

The recovery and precision point estimates across water types were subjected to an analysis of variance test to determine the effect water types had on the results. The probability of obtaining a value of an F-statistic as large as the value which was actually observed (F_{OBS}) is denoted by $P(F>F_{OBS})$ and was calculated under the assumption that the null hypothesis H_0 (no effects) was true. The null hypothesis H_0 was rejected if $P(F>F_{OBS})$ was less than 0.05 and an effect due to matrix type was implied. The effect due to a specific matrix type was judged to be statistically insignificant if the 95% confidence interval constructed about the individual intercept and slope point estimates contained zero. If either the slope or intercept confidence interval did not contain zero, then the statistical significance of the effect due to matrix type was established. However, establishment of a statistically significant effect due to matrix type does not necessarily mean that the effect is of practical importance. Practical importance was determined by a review of the retained data and judging whether the statistically significant matrix effects were influenced by the retention of several errant data points or the non-uniform recovery of one Youden concentration pair. If no anomalies were observed, the statistically significant matrix effect was considered to be of practical importance.

TABLE 8

OVERALL PERCENT RELATIVE STANDARD DEVIATION ESTIMATES

Element	Reagent Water 1	Backgrd Water 1	Reagent Water 2	Backgrd Water 2	Reagent Water 3	Backgrd Water 3	Avg across Waters
Al	7.4	6.8	6.8	9.1	9.2	8.2	7.9
Ba	11.3	17.1	7.7	6.2	11.7	22.1	12.7
Be	7.0	5.0	4.1	3.0	4.0	5.0	4.7
Ca	9.1	11.8	7.5	12.0	12.8	36.5	15.0
Cd	4.1	4.1	3.1	4.1	4.0	5.0	4.1
Co	2.8	4.9	4.7	4.6	6.4	6.0	4.9
Cr	9.2	10.0	4.4	13.4	7.4	14.6	9.8
Cu	3.0	3.0	2.0	2.0	2.0	4.0	2.7
Fe	4.8	5.6	5.6	7.3	6.0	9.0	6.4
K	8.3	12.4	7.8	10.0	8.0	6.8	8.9
Mg	7.2	11.7	3.5	4.8	5.2	9.7	7.0
Mn	6.2	5.0	4.4	6.0	7.2	5.6	5.7
Mo	9.1	22.3	13.9	15.7	10.1	11.9	13.8
Na	3.8	6.8	3.9	4.4	4.1	13.0	6.0
Ni	3.4	3.9	2.9	6.3	4.0	8.2	4.8
Pb	5.5	4.9	4.2	4.2	4.5	6.9	5.0
Sb	5.0	4.7	5.3	5.8	4.3	3.7	4.8
V	11.8	12.3	8.2	10.9	9.7	10.9	10.6
Zn	3.9	5.9	2.9	5.0	3.2	3.2	4.3
Ag	40.3	42.0	NA*	24.2	NA	27.3	33.5
Tl	5.9	6.1	NA*	8.9	NA	4.7	6.4
Average	8.1	9.8	5.4	8.1	6.5	10.6	8.5

* Only one reagent water was used as a control for Ag & Tl.

TABLE 9

SINGLE-ANALYST PERCENT RELATIVE STANDARD DEVIATION ESTIMATES

Element	Reagent Water 1	Backgrd Water 1	Reagent Water 2	Backgrd Water 2	Reagent Water 3	Backgrd Water 3	Avg across Waters
Al	5.1	3.1	3.0	3.3	5.1	3.5	3.9
Ba	5.2	0.1	6.8	3.9	3.9	13.7	5.6
Be	4.0	2.0	1.0	1.0	1.0	1.0	1.7
Ca	3.8	6.0	3.1	3.0	4.9	7.8	4.8
Cd	2.2	2.0	2.1	2.0	1.0	1.0	1.7
Co	1.6	3.9	2.3	1.4	2.8	3.7	2.6
Cr	3.4	4.1	1.0	3.2	3.7	6.6	3.7
Cu	0.4	2.0	1.0	1.0	0.4	1.0	1.0
Fe	4.0	1.8	3.4	4.1	3.0	3.4	3.3
K	3.9	11.1	6.1	5.6	4.4	5.8	6.2
Mg	3.2	3.4	2.2	2.5	2.1	7.0	3.4
Mn	1.6	3.0	7.6	4.8	2.2	1.6	3.5
Mo	3.8	5.2	3.1	4.1	3.2	3.1	4.3
Na	2.0	4.3	2.3	1.9	5.2	2.8	3.1
Ni	2.4	3.0	2.1	2.5	3.0	3.0	2.7
Pb	4.1	3.1	3.4	3.4	2.9	4.4	3.6
Sb	1.2	3.2	3.4	0.7	2.4	1.7	2.1
V	5.1	2.2	4.1	4.0	5.9	2.2	3.9
Zn	2.0	2.0	1.9	4.0	1.1	3.2	2.6
Al	21.0	36.0	NA*	16.3	NA	14.0	21.8
Tl	4.1	2.7	NA	3.7	NA	2.2	3.2
Average	4.0	5.1	3.2	3.7	2.9	4.4	4.3

* Only one reagent water was used as a control for Ag & Tl.

Fifteen elements had 23 occurrences where $P(F>F_{OBS})$ values were less than 0.0500 which implied an effect by one of the matrix waters. Of these occurrences, five were found not to be of statistical significance. The remaining 18 occurrences, having been judged to have statistically significant effects, were reviewed to determine if these matrix effects were of practical importance. A comparison of the mean recovery and percent RSD for each occurrence versus the reagent water "control" are presented below.

		% Recovery	%RSD
Barium	Reagent Water 1	97	11.3
	Background Water 1	67	17.1
	Reagent Water 3	108	11.7
	Background Water 3	50	22.1
Beryllium	Reagent Water 2	97	4.1
	Background Water 2	96	3.0
Cobalt	Reagent Water 3	104	6.4
	Background Water 3	106	6.0
Chromium	Reagent Water 1	106	9.2
	Background Water 1	107	10.0
Iron	Reagent Water 1	96	4.8
	Background Water 1	99	5.6
	Reagent Water 3	94	6.0
Potassium	Reagent Water 2	104	7.8
	Background Water 2	99	10.0
Manganese	Reagent Water 3	101	7.2
	Background Water 3	101	5.6
Molybdenum	Reagent Water 2	101	13.9
	Background Water 2	100	15.7
	Reagent Water 3	115	10.1
	Background Water 3	113	11.9
Sodium	Reagent Water 2	101	3.9
	Background Water 2	94	4.4

Nickel	Reagent Water 3	99	4.0
	Background Water 3	98	8.2
Lead	Reagent Water 1	104	5.5
	Background Water 1	95	4.9
	Reagent Water 3	103	4.5
	Background Water 3	81	6.9
Antimony	Reagent Water 2	105	5.3
	Background Water 2	102	5.8
Thallium	Reagent Water 2	94	5.9
	Background Water 2	96	8.9
Zinc	Reagent Water 2	99	2.9
	Background Water 2	95	5.0

Thirteen of the eighteen occurrences show small differences in the % recovery and %RSD values compared to their reagent water counterparts. Only four elements; barium, cobalt, iron and lead showed practical differences in the % recovery and %RSD values compared to their reagent water. These four elements exhibited statistically significant matrix effects which are considered to be of practical importance. Each are discussed separately.

Barium - The slopes of the mean recovery regression equations for background water 1 and 3 were significantly different than their reagent water counterparts.

Reagent water 1	0.97
Background water 1	0.67
Reagent water 3	1.08
Background water 3	0.50

Reviewing the summary statistics for reagent water 1 in Appendix C showed a mean recovery for all six concentrations ranging from 98.4% to 93.38% with percent relative standard deviations of 3.87% to 15.5%. The summary statistics for background water 1 were quite different. Ampuls 1 to 4 spiked into background water 1 shows low mean recoveries from 81.2 % to

TABLE 10

MATRIX EFFECT SUMMARY

Element	Backgrd Water	$P(F>F_{OBS})$	Significant Intercept	Significant Slope	Practical Significance
Ba	1	0.0000	No	Yes	Yes
	3	0.0000	No	Yes	Yes
Be	1	0.0387	No	No	-
	2	0.0002	No	Yes	No
Co	1	0.0467	No	No	-
	3	0.0000	Yes	Yes	Yes
Cr	1	0.0305	Yes	No	No
Fe	1	0.0000	Yes	Yes	Yes
	2	0.0005	No	No	-
	3	0.0012	Yes	No	No
K	2	0.0143	No	Yes	No
Mg	1	0.0004	No	No	-
Mn	3	0.0168	No	Yes	No
Mo	2	0.0444	Yes	Yes	No
	3	0.0100	Yes	Yes	No
Na	1	0.0210	No	No	-
	2	0.0095	Yes	Yes	Yes
Ni	3	0.0000	Yes	Yes	No
Pb	1	0.0000	No	Yes	Yes
	3	0.0000	Yes	Yes	Yes
Sb	2	0.0060	Yes	Yes	No
Zn	2	0.0167	No	Yes	No
Tl	2	0.0081	Yes	No	No

64.8% with larger %RSDs, 12.5% to 22.3%. Ampuls 5 and 6 spiked into background water 1 had slightly higher recoveries but were more variable than their reagent water counterpart. The background concentration of barium in background water 1 was very small compared to the spiked concentrations and was not considered a cause for the observed low recovery.

Reagent water 3, on the other hand, showed recoveries of 102% to 110% except for ampul 6 at 94.4%. The %RSD for this water was 8.1% to 14.2%. Background water 3 had recoveries from 98% to 38.8% with %RSD from 18.7% to 29.5%. The data reported for background water 3 was much more variable than its reagent water counterpart and was not due to retention of a few errant data points. The background concentration of barium in this water matrix was low compared to the spiked concentrations.

Based on the summary statistics for barium recovery and precision through background waters 1 and 3, the matrix effects were found to be statistically significant and of practical importance.

Cobalt - Background water 3 showed a statistically significant matrix effect for both the intercept and slope estimates of the recovery regression equation. This water had a background concentration of cobalt at approximately 27 mg/L. The concentration range covered for this matrix water was 12 - 60 mg/L. The four lowest ampul concentrations, 12 mg/L, 18 mg/L, 24 mg/L, and 30 mg/L all had recoveries around 112%. The high Youden pair, however, had approximately equal recoveries at 106%. The %RSD for these six Youden concentrations was 2.5% - 8.4%. Reagent water 3 showed recoveries ranging from 102% to 105%, again, with very good precision, 4.5% to 7.4%. The recoveries for the two high reagent water 3 concentrations were 105% and 105%. The corresponding recoveries for the same samples in matrix water 3 were 106% and 106%. At these higher elemental concentrations, the background concentration of cobalt had less of an affect than at the lower concentrations where the background concentration was a greater fraction of the total cobalt analyzed.

The matrix effect for cobalt is considered to be of practical importance and appears to affect the mean recovery at lower concentrations. The precision is unaffected by these same matrix effects.

Iron - Background water 1 showed a statistically significant matrix effect for both the intercept and slope estimates of the recovery regression equations. This matrix water had an iron background concentration of 2.6 mg/L. The concentration range for this study was 2.7 - 11.3 mg/L. The two highest spike concentrations, 11.3 mg/L and 9.0 mg/L had mean recoveries of 97.7% and 98.3% respectively, while the reagent water recoveries for the same ampuls was 94.3% and 95.2%. The precisions for each set of ampuls were comparable ranging from 4% to 8%.

The four lower concentrations, however, had much higher recoveries for matrix water 1 compared to reagent water 1. The spike concentration range for these ampuls was from 6.7 mg/L to 2.7 mg/L. The reagent water 1 recoveries were 96.3%, 96.2%, 94.9%, 93.8% with %RSD from 3.6% to 5.8% The background water 1 recoveries were 108%, 107%, 104%, 105% respectively, with %RSD from 3.2% to 5.8%.

The observed statistically significant matrix effects are considered of practical importance and affect the mean recovery as concentration approaches the lower end of the instrument operating range. The precision appears unaffected by the matrix.

Lead - Statistically significant matrix effects were observed for background waters 1 and 3. The reagent water counterparts of these two waters produced nearly identical mean recovery results ranging from 102% to 107% with %RSD of 2.4% to 7.5%. The only exception was the lowest concentration sample at 0.75 mg/L which had higher %RSD, 15.2% for background water 1 and 23.1% for background water 3.

The background waters, on the other hand, had lower recoveries on all but two samples. Background water 1 had recoveries of 94.6%, 92.2%, 98.4%,

and 101% for the four highest sample concentrations and 109% and 109% for the two lowest. The %RSD was 2.6% to 8.4%. Background water 3 recoveries in descending order are 75.6%, 84.8%, 82.2%, 88.2%, 97.3%, 91.6% with %RSD of 5.1% to 9.8%. For both background waters the matrix effect was stronger at the higher concentrations than at the lower concentrations.

The statistically significant matrix effects observed for lead are of practical importance and appears to affect lead recoveries at higher concentration levels outside of the optimum range of the AAS. The precision is unaffected by these matrix effects.

Sodium - Sodium background water 2 was identified as having a statistically significant matrix effect based on its regressed mean recovery of 94% compared to reagent water 2 at 101%. A careful review of the returned data for background water 2 shows that ampul 1 had a recovery of 88.3% of the spiked concentration, %RSD was 4.2%. Reagent water 2 had a recovery of 98.5%, %RSD of 3.7%. This anomaly cannot be explained. All ampuls were verified for content by EMSL-Cincinnati by ICP and sodium in ampul 1 for background water 2 was confirmed. Extreme variability of returned data was not the cause as evidenced in the low %RSDs. Removing this anomaly changes the recovery regression to:

$$x = 1.008C - 0.837$$

which is very similar to the reagent water 1 recovery regression equation. Based on this observation, the statistically significant matrix effect for sodium in ground water 2 is not considered to be of practical importance.

MINIMUM DETECTION LIMITS (MDLs)

Minimum detection limits, calculated using the procedure adopted by The International Union of Pure and Applied Chemistry, are given for each of the elements and waters in Appendix E. As indicated previously, some of the

matrices contained significant amounts of indigenous metals, therefore, MDLs were not determined for those trace metals. It should be noted that some laboratories reported an MDL of zero which resulted from no response to the reagent water digestate, therefore, a standard deviation of zero.

The average MDL for each water type/element is shown in Appendix E and in almost all cases, the MDLs agree closely and indicates that there was virtually no effect on the magnitude of the MDLs because of the particular water type. A comparison of the average MDL for all water types with SW-846 method detection limits for AA-flame is shown in Table 11. This comparison shows close agreement for barium, beryllium, magnesium, vanadium, cadmium, chromium, manganese, nickel, molybdenum, and zinc. Elements with higher MDLs than SW-846 method detection limits were aluminum, calcium, iron, sodium, antimony, and thallium. Elements with lower MDL's than the SW-846 method detection limits were potassium, cobalt, copper and lead. These lower detection limits, determined from this IMVS study, include zero responses reported by the participating laboratories. Because zero responses were included, the average standard deviation was lower, which subsequently reduced the MDLs as calculated in the IMDL equation.

EVALUATION OF LABORATORY PERFORMANCE AT LOW CONCENTRATION LEVELS

The final objective of the study was to evaluate the performance of the participating laboratories at trace metal concentrations slightly above the MDL reported in SW-846 methods. Therefore, the three ground waters and reagent water were spiked with a Youden pair concentration level approximating 5x MDL (ampuls 7-8 in this report). These were compared with the lowest Youden pair (ampuls 5-6) concentration levels near the lowest part of the optimum range reported in the SW-846 methods, approximately 10x MDL.

The overall percent relative standard deviation (% RSD) and single-analyst %RSD were used to evaluate performance. Analytes that could not be evaluated due to high background concentration levels in the natural matrices included Ca, Fe, K, Mg, Mn and Na. Background water 3 data was also excluded

TABLE 11

COMPARISON OF MEASURED DETECTION LIMITS VERSUS
REPORTED DETECTION LIMITS

Element	Reported SW 846 (ug/L)	Measured IMVS limits (ug/L)
Al	100	260
Ba	100	90
Be	5	5
Ca	10	23*
Fe	30	50*
K	10	5
Mg	1	2*
Mo	100	117
Na	2	9*
Sb	200	433
V	200	270
Ag	10	14
Cd	5	7
Co	50	34
Cr	50	53
Cu	20	6
Mn	10	15
Ni	40	39
Pb	100	83
Tl	100	184
Zn	5	7

* For reagent water only

for Ni, Cu, Co, Cr and Zn for the same reason. These elements were excluded because a small concentration would have been spiked into a sample containing a large background concentration of the specific analyte and the precision and recovery observed would be of the larger background concentration.

The overall and single-analyst %RSDs were computed by the IMVS program for each water type. The overall %RSD was averaged between each of the Youden pairs and reported for each water type, with the single-analyst %RSD's for each analyte, in Appendix C. To facilitate a general conclusion for all water types at a 5x MDL concentration level, versus the lower concentration level of the optimum range, the overall %RSD's were combined and an average calculated. The single-analyst %RSD's were similarly treated. Data for the lower part of the optimum range (ampuls 5-6) and 5x MDL concentration level (ampuls 7-8) are shown in Table 13. It should be noted that the concentration levels of ampuls 7-8 for each analyte were approximately one-half those in ampuls 5-6, except for aluminum levels which were about one-tenth of ampul 5-6.

The ratio of the %RSD of ampuls 7-8/5-6 provides a measure of the magnitude of the increase in the %RSD when operating on a routine basis at 5x MDL. For most trace metals, the overall %RSD increases, anywhere from 3.8 times to 1.1; antimony shows no increase and slight decreases in the overall %RSD are shown for lead and cadmium. The largest overall %RSD at the 5x MDL level occurred for aluminum which can be explained in part by the fact that the concentration level was only one-tenth of the lower limit of the optimum range and that indigenous aluminum was in significant quantities in each of the three natural matrices.

The smallest overall %RSD at the 5x MDL level occurred for copper. The average overall %RSD for all analytes in ampuls 5-6 was 15.3% whereas the 5x MDL was 22.1%.

The ratio of the single-analyst %RSD (ampuls 7-8/ampuls 5-6) varies from 0.7 for lead to 3.8 for aluminum. Generally, the single-analyst %RSD increases with decreasing concentration, however, lead, silver and cadmium show slight decreases with decreasing concentration. On the average, for all analytes, ampuls 5-6 had 8.8% RSD and ampuls 7-8 had 10.8% RSD.

TABLE 12. %RSD AVERAGES FOR YOUDEN PAIR AMPULS 5-6 VERSUS AMPULS 7-8*

	Overall %RSD			Single Analyst %RSD		
	Ampuls	Ampuls	Ratio	Ampuls	Ampuls	Ratio
Analyte	5-6	7-8	7-8/5-6	5-6	7-8	7-8/5-6
Ag	17.4(0.10)**	35.5(0.05)**	2.1	17.8	16.4	0.9
Al	9.5(5.5)	36.4(0.55)	3.8	3.9	14.5	3.8
Ba	15.1(1.2)	17.7(0.62)	1.1	8.2	10.3	1.3
Be	14.3(0.05)	16.0(0.025)	1.1	8.3	10.6	1.3
Cd	24.9(0.05)	19.9(0.025)	0.8	9.2	8.5	0.9
Co***	5.6(0.40)	13.0(0.20)	2.3	4.5	5.9	1.3
Cr***	12.6(0.53)	16.7(0.26)	1.3	4.7	8.9	1.9
Cu	8.5(0.18)	12.2(0.09)	1.4	5.1	6.7	1.3
Mo	16.4(0.89)	18.9(0.43)	1.2	7.6	11.0	1.5
Ni***	18.2(0.28)	22.9(0.19)	1.3	11.2	13.5	1.2
Pb	13.8(0.94)	20.9(0.47)	1.5	11.9	8.4	0.7
Sb	22.3(0.94)	27.2(0.53)	1.2	10.5	10.0	1.0
Tl	12.7(1.04)	14.4(0.66)	1.1	7.2	9.5	1.3
V	15.9(2.35)	23.8(1.18)	1.5	6.9	10.3	1.5
Zn***	22.0(0.06)	35.4(0.025)	1.6	14.5	18.2	1.3
Avg	15.3	22.1		8.8	10.8	

* Averages are taken from all nine laboratories across all water types.

** Average concentration of youden pair - mg/L in parenthesis.

*** Background water 3 data were not used in calculating the %RSD because of high background concentration in this water.

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APPENDIX A

LABORATORY INSTRUCTIONS

USEPA METHOD 3005

LABORATORY INSTRUCTIONS

TEST METHOD 3005

Before proceeding, make sure you have all the necessary sample bottles as outlined on the packing list.

2.1 Sample Digestion

Shake all bottles well before removing aliquots. The majority of the samples are prepared with ground water containing sediment which must be uniformly suspended before transfer.

Each bottle contains approximately 100 milliliters of spiked ground water or reagent water. From each bottle quantitatively transfer a 100 milliliter aliquot to a digestion beaker and proceed with digestion procedure as outlined in section 7.2 of method 3005. Digest all samples, as a group, according to water type. Table 2 summarizes the 3005 sample groupings. A typical digestion group will be as follows.

8 Samples (e.g. Mix 1, Amp 1 through Amp 8).
2 QC Samples (ICAP-19 and ICAP-7).
2 Matrix blanks (e.g. Water 1) in duplicate
1 Procedural blank (Laboratory reagent water).

QC sample and blank digestions are covered in subsequent sections.

Record all digestion procedures in the laboratory notebook provided. This will include exact volumes and type of acid added and the duration of heating cycle and hot plate setting throughout each digestion group. It is important that method 3005 be followed exactly for this is a method validation study not a method development study. Do not attempt to maximize any step in the digestion procedure based on past experience.

After the samples have been digested, filter, if necessary, and dilute the digestate to 100 milliliters using ASTM type II water. The sample is now ready for analysis. Total sample digestions = 76.

2.2 Blank Digestion

Two types of blanks will be used for this study. The first is a matrix blank and the second a procedural blank.

For the matrix blanks three ground water matrices and one reagent water matrix are provided in one gallon bottles. These matrices are unspiked and require digestion and analysis for background concentrations. Remember, the appropriate matrix blank must be digested with each sample group containing that matrix. These matrix blanks will be digested and analyzed in duplicate for they will also be used for the Option III recovery calculations. Number of matrix blanks to be digested are 4 matrices x 2 mixes x 2 (duplicates) = 16. NOTE. Since DISTIL 1, DISTIL 2, DISTIL 3, and DISTIL 4 (TABLE 2) are all the same matrix, only one matrix blank will have to be digested. The blank corrections obtained can be applied to the other three DISTIL waters.

The procedural blank will be your own laboratory reagent water digested with each of the 3005 sample groups using the same reagents and procedures. These blanks will be used to isolate systematic errors which may be introduced into the results based on laboratory procedure. A procedural blank should be analyzed with each sample group. Number of procedural blanks to be digested = 10.

The digestion procedure will be the same as described for the samples. Each blank matrix must be well shaken before aliquots are removed to ensure a homogeneous suspension. Remove a 100 milliliter aliquot from each matrix and digest according to method 3005 section 7.2. Record all digestion conditions in the laboratory notebook. When completed filter, if necessary, and dilute the digestate to 100 milliliters using ASTM type II water. The

blanks are now ready for analysis.

2.3 Quality Control Sample Digestions

Twenty USEPA Quality Control (QC) Samples are being provided for this study. There are 10 USEPA ICAP-19 WP 1083 conc 1 ampuls and 10 USEPA ICAP-7 WP 1083 conc 1 ampuls. Dilution instructions are as follows:

ICAP-19 Pipet exactly 20 mL into a 100 mL volumetric flask. Bring to volume with ASTM type II water.

ICAP-7 Pipet exactly 5 mL into 100 mL volumetric flask. Bring to volume with ASTM type II water.

The reference values for these diluted QC samples, and the $\pm$ 20% acceptance limits, are found in Table A.

TABLE A

REFERENCE VALUES FOR QC SAMPLES

ICP - 19

Parameter	Reference Value (mg/L)	Acceptance Limits (mg/L) 80%	120%
Sb	1.98	1.58	2.38
Be	1.92	1.54	2.30
Cd	1.88	1.50	2.26
Ca	2.00	1.60	2.40
Cr	2.06	1.65	2.47
Cu	2.06	1.65	2.47
Co	2.00	1.60	2.40
Fe	2.04	1.63	2.45
Pb	2.02	1.62	2.42
Mg	2.00	1.60	2.40
Mn	2.04	1.63	2.45
Mo	2.12	1.70	2.54
Ni	2.04	1.63	2.45
Tl	2.02	1.62	2.42
V	2.02	1.62	2.42
Zn	2.02	1.62	2.42

ICAP - 7

Parameter	Reference Value (mg/L)	Acceptance Limits (mg/L) 80%	120%
Ag	4.95	3.96	5.94
Al	4.85	3.88	5.82
Ba	4.85	3.88	5.82
K	50.0	40.0	60.0
Na	4.30	3.44	5.16

WP 1083

The QC samples are now ready for digestion. Quantitatively transfer 100 milliliters of each of the QC samples to digestion beakers and proceed with the digestion procedure outlined in method 3005 section 7.2. Remember, one ICAP-19 and one ICAP-7 QC sample must be digested with each sample group. These QC samples are being used as independent check samples on the entire analytical procedure, from digestion to instrumental analysis. If an analyte value falls outside of its acceptance limits the entire group of samples will have to be redigested and analyzed at the participating laboratory's expense. Additional sample bottles and QC ampuls can be obtained by calling Mr. Kenneth Edgell at The Bionetics Corporation (513) 771-0448. Be extremely cautious during all digestion procedures.

2.4 Instrumental Analysis

Instrumental analysis will be performed using conditions and methods specified in the EPA 7000 series of methods and the instrument manual.

The number and type of samples to be analyzed for the method validation study are summarized in TABLE 2. A total of 76 samples (exclusive of blanks and quality control samples) must be digested and analyzed. In order to avoid systematic errors due to sampling order the following analytical order will be followed by each participating laboratory:

Mix 1

Laboratory Code	Analytical Orders* 1	2	3	4	5	6
1	W1	D1	W2	D2	W3	D3
2	D2	W2	D1	W1	W3	D3
3	W3	D3	W1	D1	W2	D2
4	D3	W3	W2	D2	D1	W1
5	D1	W1	D3	W3	D2	W2
6	W2	D2	D1	W1	W3	D3
7	W1	D1	W3	D3	D2	W2
8	W3	D3	D2	W2	D1	W1
9	D2	W2	W3	D3	W1	D1

*W1 = WATER 1 etc.
D1 = DISTIL 1 etc.

Mix 2

Laboratory Number	Analytical Order* 1	2	3	4
1	W1	W3	W2	D4
2	W3	W1	D4	W2
3	D4	W1	W2	W3
4	D4	W3	W1	W2
5	W3	D4	W2	W1
6	W2	W1	D4	W3
7	W1	D4	W2	W3
8	W2	D4	W3	W1
9	W1	W2	W3	D4

*W1 = WATER 1 etc.
D2 = DISTIL 2 etc.

Within each water type group the analytical order will be from Amp 1 to Amp 8 for the odd numbered laboratories and from amp 8 to amp 1 for the even numbered laboratories. The minimum analytical outline to be used will be as follows:

> Calibration curve; 8 water types (Amp 1 through Amp 8); 2 matrix blanks (duplicates); 2 quality control samples (ICAP-19 & ICAP-7); 1 procedural blank; calibration check sample.

This minimum outline should not preclude your normal QC/QA procedures.

Record all raw data obtained in the laboratory notebook.

2.5 Data report forms

There are three sets of data report forms. The main set (white pages) which will be used for the 3005 study and the two colored sets to be used for OPTION I and OPTION III results.

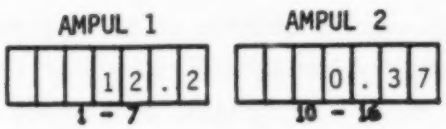
The data report forms have been bound into a booklet for easier use. Each report form is devoted to one element for several water types. Close attention should be paid to the form you are filling out.

For all bottles marked Amp 1 through Amp 6 an analytical value MUST be reported. Contractors will not be paid for data reported as zero or less than MDL. There is sufficient analyte present in each of these bottles to make analytical data obtainable by all contractors. This requirement also applies to the OPTION III digestate samples.

There are exceptions to this requirement. All bottles labelled AMP 7 and AMP 8 and OPTION I data can be reported as zero or less than MDL. The analyte concentrations in AMP 7 and AMP 8 are very low and will require an optimally tuned instrument to obtain data from some of the sample waters.

Several of the standard additions concentrations in OPTION I may not be analyzable on your instrument. It is acceptable to report a zero or less than an MDL for OPTION I data calculations.

Make sure your laboratory code is on each page. All data is to be reported as milligrams per liter (mg/L) and corrected for background concentrations. Numbers are to be right justified in the appropriate boxes. A decimal point will have its own box.



The significant figure format to be used is as follows.

XXX
XX.X
X.XX
0.XX
0.0XX

At the completion of this study, return the laboratory notebook and data report form booklet to:

Mr. Kenneth Edgell
The Bionetics Corporation
16 Triangle Park Drive
Cincinnati, Ohio 45246
(513) 771-0448

3. QUALITY CONTROL/QUALITY ASSURANCE REQUIREMENTS

Each participating laboratory will be required to implement quality control/quality assurance protocols for this study. These protocols must include, but are not limited to, the following procedures:

1. Preparation of calibration curves for each element. Each curve will consist of a blank and at least four calibration standards.

2. Analysis of check standards at the beginning and end of each working day and at a frequency of 10% during analytical runs. If analysis of a check standard is not not within + 5% of the expected value, analysis must be terminated, the instrument must be recalibrated, and all samples run since last successful check standard must be reanalyzed.

3. Preparation and analysis of one procedural blank for every water group.

4. Analysis of an outside reference standard having known values. This sample will be provided by EPA and will be analyzed with each analytical group as covered in section 2.3 of this packet.

5. Maintenance of accurate written records that trace all samples from receipt through preparation, analysis, and final data submittal. Each contractor will be required to maintain all pertinent raw and final data until informed otherwise by EPA.

6. Maintenance of logs documenting instrument repairs or modifications performed during the time frame of this study.

INSTRUCTIONS TO LABORATORIES USING IMVS CODING FORMS

Each reported value is to be placed in its assigned set of boxes using the following rules:

1. Reported values should be right justified and kept to five digits or less not including any "+" or "-" signs used.

2. The only non-numeric characters that should be used in coding reported values are as follows:

   * A single decimal point may, at the discretion of the laboratory, appear before or after any numeric digit.

   * A single "+" and/or "-" sign may appear immediately to the left of the first numeric digit.

   * All blank boxes must appear to the left of the first non-blank character.

3. Each character, including the decimal point, must be inserted into a box of its own.

METHOD 3005

ACID DIGESTION OF WATERS FOR TOTAL RECOVERABLE OR
DISSOLVED METALS FOR ANALYSIS BY FLAA OR ICP SPECTROSCOPY

1.0 SCOPE AND APPLICATION

1.1 Method 3005 is an acid digestion procedure used to prepare surface water and ground water samples for analysis by flame atomic absorption spectroscopy (FAA) or by inductively coupled argon plasma spectroscopy (ICP). Samples prepared by Method 3005 may be analyzed by AAS or ICP for the following metals:

Aluminum	Magnesium
Antimony	Manganese
Arsenic*	Molybdenum
Barium	Nickel
Beryllium	Potassium
Cadmium	Selenium*
Calcium	Silver
Chromium	Sodium
Cobalt	Thallium
Copper	Vanadium
Iron	Zinc
Lead	

*ICP only

1.2 For the analysis of total dissolved metals, the sample is filtered at the time of collection, prior to acidification with nitric acid.

2.0 SUMMARY OF METHOD

2.1 Total recoverable metals: The entire sample is acidified at the time of collection with nitric acid. At the time of analysis the sample is heated with acid and substantially reduced in volume. The digestate is filtered and diluted to volume, and is then ready for analysis.

2.2 Dissolved metals: The sample is filtered through a 0.5 um filter at the time of collection and the liquid phase is then acidified at the time of collection with nitric acid. At the time of analysis the sample is heated with acid and substantially reduced in volume. The digestate is again filtered (if necessary) and diluted to volume and is then ready for analysis.

3.0 INTERFERENCES

3.1 The analyst should be cautioned that this digestion procedure may not be sufficiently vigorous to destroy some metal complexes.

4.0 APPARATUS AND MATERIALS

4.1 Griffin beakers of assorted sizes.

4.2 Watch glasses.

4.3 Qualitative filter paper and filter funnels.

5.0 REAGENTS

5.1 ASTM Type II water (ASTM D1193): Water should be monitored for impurities.

5.2 Concentrated nitric acid, reagent grade (HNO_3): Acid should be analyzed to determine level of impurities. If method blank is <MDL, then acid can be used.

5.3 Concentrated hydrochloric acid, reagent grade (HCl): Acid should be analyzed to determine level of impurities. If method blank is <MDL, then acid can be used.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 All samples must have been collected using a sampling plan that addresses the considerations discussed in Chapter Nine of this manual.

6.2 All sample containers must be prewashed with detergents, acids, and Type II water. Plastic and glass containers are both suitable.

6.3 Sampling

6.3.1 Total recoverable metals: All samples must be acidified at the time of collection with HNO_3 (5 mL/L).

6.3.2 Dissolved metals: All samples must be filtered through a 0.5 um filter and then acidified at the time of collection with HNO_3 (5 mL/L).

7.0 PROCEDURE

7.1 Transfer a 100 mL aliquot of well-mixed sample to a beaker. The sample is covered with a ribbed watch glass and heated on a steam bath or hot plate at 90 to 95°C until the volume has been reduced to 15-20 mL.

7.2 For metals that are to be analyzed by FLAA or ICP, add 2 mL of concentrated HNO_3 and 5 mL of concentrated HCL. The sample is covered with a ribbed watch glass and heated on a steam bath or hot plate at 90 to 95°C until the volume has been reduced to 15-20 mL.

CAUTION: Do not boil. Antimony is easily lost by volatilization from hydrochloric acid media.

7.3 Remove the beaker and allow to cool. Wash down the beaker walls and watch glass with Type II water and, when necessary, filter or centrifuge the sample to remove silicates and other insoluble material that could clog the nebulizer. Filtration should be done only if there is concern that insoluble materials may clog the nebulizer; this additional step is liable to cause sample contamination unless the filter and filtering apparatus are

thoroughly cleaned and prerinsed with dilute HNO_3.

7.4 Adjust the final volume to 100 mL with Type II water.

8.0 QUALITY CONTROL

8.1 For each analytical batch of samples processed, blanks (Type II water reagents) should be carried throughout the entire sample preparation and analytical process. These blanks will be useful in determining if samples are being contaminated.

8.2 Duplicate samples should be processed on a routine basis. A duplicate sample is a sample brought through the whole sample preparation and analytical process. Duplicate samples will be used to determine precision. The sample load will dictate the frequency, but 20% is recommended.

8.3 Spiked samples or standard reference materials should be employed to determine accuracy. A spiked sample should be included with each group of samples processed and whenever a new sample matrix is being analyzed.

9.0 METHOD PERFORMANCE

9.1 No data provided.

10.0 REFERENCES

10.1 None required.

APPENDIX B

RAW DATA

RAW DATA FOR ALUMINUM, AL IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		50.00	40.00	25.00	20.00	6.00	5.00
LAB/AN	LAB REJECTED						
11		42.90	32.80	23.40	19.10	5.91	4.79
21		47.30	37.80	19.60	19.30	5.72	4.77
31		50.70	39.50	25.40	19.80	5.82	4.76
41		40.80	35.30	22.50	18.10	5.36	4.19
51	*	48.68*	40.67*	23.92*	20.79*	6.13*	5.05*
61		44.30	34.30	21.50	16.20	5.19	4.34
71		43.30	33.30	22.80	18.30	5.33	4.44
81	*	33.80*	27.30*	17.90*	14.40*	4.49*	3.82*
91	*	54.23*	43.30*	26.36*	20.45*	5.83*	5.19*

RAW DATA FOR ALUMINUM, AL IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		50.00	40.00	25.00	20.00	6.00	5.00
LAB/AN	LAB REJECTED						
11		40.50	32.20	23.30	18.30	5.67	5.08
21		43.90	35.60	22.60	18.40	5.67	4.49
31		48.20	39.10	24.00	19.40	5.64	4.54
41		44.20	32.80	23.20	19.20	5.95	4.59
51		48.53	39.19	26.63	20.38	6.19	5.30
61		48.80	38.30	24.70	17.10	5.50	4.59
71		43.80	34.60	22.80	18.40	5.35	4.54
81	*	30.80*	25.20*	16.10*	13.60*	4.59*	4.04*
91	*	55.85*	46.13*	28.71*	22.37*	6.89*	5.40*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR ALUMINUM, AL IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		50.00	40.00	25.00	20.00	6.00	5.00
LAB/AN	LAB REJECTED						
11		47.70	37.90	23.30	18.80	5.50	4.91
21		51.20	40.90	26.20	20.10	5.96	5.01
31	*	52.80*	42.70*	26.50*	20.80*	6.18*	5.20*
41		51.80	40.60	22.80	15.90	5.95	4.92
51		50.92	39.49	24.45	19.79	5.70	4.49
61		48.40	39.30	21.00	16.00	5.42	4.33
71		43.00	36.10	22.60	18.20	5.23	4.42
81	*	39.60*	35.10*	21.70*	16.50*	4.78*	3.86*
91	*	59.52*	46.59*	28.86*	22.48*	6.80*	5.21*

RAW DATA FOR ALUMINUM, AL IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		50.00	40.00	25.00	20.00	6.00	5.00
LAB/AN	LAB REJECTED						
11		37.00	34.00	21.60	17.70	5.12	4.17
21		47.20	39.20	24.20	19.40	5.19	4.25
31		51.10	40.90	25.30	19.90	5.76	4.89
41		51.00	43.30	21.70	17.30	5.24	4.47
51		49.15	40.40	23.92	20.34	6.28	5.40
61		47.70	38.10	21.80	15.80	5.15	4.18
71		44.00	35.10	22.30	17.90	5.44	4.67
81	*	38.50*	29.80*	18.60*	14.90*	4.66*	4.05*
91	*	57.97*	45.60*	28.37*	21.55*	6.44*	5.18*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR ALUMINUM, AL IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		50.00	40.00	25.00	20.00	6.00	5.00
LAB/AN	LAB REJECTED						
11		49.40	39.20	24.40	19.80	5.94	5.04
21		56.00	42.80	27.00	21.00	6.31	5.37
31		56.30	43.60	26.10	20.80	6.03	5.06
41		46.30	43.00	23.40	19.40	5.47	3.97
51		53.04	42.62	28.18	20.88	5.88	4.91
61		47.70	37.60	21.00	16.60	4.83	4.66
71	*	42.90*	32.90*	22.30*	18.10*	5.14*	4.29*
81		46.40	37.70	20.30	17.00	5.26	4.40
91	*	58.78*	45.70*	28.86*	22.90*	6.06*	5.79*

RAW DATA FOR ALUMINUM, AL IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		50.00	40.00	25.00	20.00	6.00	5.00
LAB/AN	LAB REJECTED						
11		47.20	36.70	23.10	18.30	5.43	4.66
21		56.50	43.70	26.60	20.60	5.92	4.84
31		53.10	41.80	26.40	20.00	5.81	4.72
41		46.30	36.40	22.20	19.40	5.95	5.01
51		55.62	43.44	27.70	21.75	6.19	5.02
61		47.60	38.60	23.40	17.20	5.93	4.13
71		45.20	35.50	23.40	19.20	5.33	4.57
81	*	41.00*	35.10*	22.00*	17.00*	5.20*	4.36*
91	*	57.27*	47.06*	29.24*	22.82*	6.46*	5.07*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR BARIUM, BA IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		20.90	17.50	6.99	5.25	1.40	1.05
LAB/AN	LAB REJECTED						
11		15.30	11.80	6.00	4.90	1.32	0.91
21	*	24.50*	20.70*	7.97*	5.98*	1.64*	1.14*
31		24.10	19.60	7.50	5.63	1.31	0.91
42		19.80	15.70	6.26	4.77	1.38	1.04
51		22.83	18.62	6.89	5.11	1.34	1.07
61		23.50	17.70	7.40	5.10	2.00*	1.54*
71		18.40	16.70	6.65	5.04	1.29	1.00
81		19.50	16.00	6.23	5.42	1.23	1.13
91	*	15.83*	12.57*	3.78*	2.80* <	0.50* <	0.50*

RAW DATA FOR BARIUM, BA IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		20.90	17.50	6.99	5.25	1.40	1.05
LAB/AN	LAB REJECTED						
11		8.70	7.20	4.56	4.49	1.42	1.08
21	*	19.60*	14.40*	8.02*	5.43*	1.49*	1.14*
31		12.80	10.40	5.40	4.66	1.46	0.94
42		14.50	11.80	4.27	3.48	1.28	0.76
51		14.92	10.83	4.98	3.82	1.38	1.06
61		16.00	15.30	6.05	3.92	1.67	1.52
71		13.30	10.60	6.32	4.46	1.24	0.95
81		17.40	13.30	5.52	5.00	1.43	1.34
91	*	7.80*	5.64*	0.20* <	0.50* <	0.50* <	0.50*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR BARIUM, BA IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		21.00	17.50	6.99	5.24	1.40	1.05
LAB/AN	LAB REJECTED						
11		17.10	18.60	6.70	5.34	1.46	1.08
21	*	24.90*	20.50*	8.27*	6.08*	1.59*	1.24*
31	*	23.90*	19.60*	7.97*	6.07*	1.76*	1.06*
42		19.20	15.30	5.64	4.65	1.16	1.01
51		21.48	17.47	6.33	4.66	1.34	0.99
61		16.40	16.30	5.84	4.22	1.23	0.89
71		18.50	15.60	6.34	4.78	1.17	0.91
81		20.40	17.60	7.13	4.92	1.22	0.95
91		20.91	16.77	6.30	4.57	0.96	0.66

RAW DATA FOR BARIUM, BA IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		21.00	17.50	6.99	5.24	1.40	1.05
LAB/AN	LAB REJECTED						
11		18.40	17.10	6.80	5.08	1.37	1.05
21	*	23.60*	20.10*	8.32*	6.38*	1.69*	1.24*
31	*	22.40*	18.50*	7.56*	5.41*	1.52*	1.16*
42		18.00	15.30	5.77	4.65	1.16	0.91
51		19.73	16.84	6.64	4.97	1.12	0.88
61		18.90	15.50	6.53	4.23	1.32	1.04
71		19.40	17.40	6.76	4.75	1.26	0.96
81		22.40	18.00	6.32	4.88	1.26	0.86
91		19.81	15.93	6.20	4.50	0.70*	0.34*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR BARIUM, BA IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		21.00	17.50	6.99	5.24	1.40	1.05
LAB/AN	LAB REJECTED						
11		25.90	20.80	7.24	5.93	1.40	1.04
21	*	26.30*	21.60*	8.77*	6.33*	1.69*	1.24*
31		23.00	19.70	8.09	6.23	1.52	0.88
42		20.40	16.80	6.89	5.02	1.53	0.89
51		21.92	17.84	6.49	4.81	1.29	0.96
61		21.00	17.70	5.36	4.06	1.20	1.03
71	*	20.30*	16.60*	6.29*	5.10*	1.14*	0.95*
81		23.00	20.30	8.21	5.60	1.60	1.05
91		26.45	20.74	7.86	5.84	1.37	1.08

RAW DATA FOR BARIUM, BA IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		21.00	17.50	6.99	5.24	1.40	1.05
LAB/AN	LAB REJECTED						
11		7.54	7.18	4.48	4.76	1.60	1.23
21		12.60	15.80*	4.63	4.23	1.49	0.99
31		5.48	7.30	4.53	4.38	1.86	1.27
42		8.01	5.77	4.37	4.15	0.91	0.49
51		9.07	7.72	3.73	3.37	1.24	0.75
61		6.66	7.87	3.18	2.91	1.03	0.70
71		6.55	6.30	3.11	3.40	1.36	0.98
81		8.15	4.17	6.49	5.77	1.70	0.85
91		11.21	7.51	5.29	4.56	1.10	0.68

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR BERYLLIUM, BE IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		2.00	1.60	0.80	0.60	0.06	0.04
LAB/AN	LAB REJECTED						
11		2.01	1.62	0.80	0.60	0.05	0.03
21		1.81	1.47	0.76	0.57	0.06	0.04
32		1.69	1.40	0.71	0.55	0.06	0.04
41		1.83	1.46	0.68	0.52	0.06	0.04
51		1.84	1.48	0.76	0.55	0.06	0.04
61		2.22	1.55	0.71	0.59	0.04	0.02*
71		2.02	1.63	0.77	0.59	0.60*	0.04
81		1.98	1.57	0.78	0.61	0.06	0.04
91		2.00	1.64	0.82	0.59	0.05	0.03*

RAW DATA FOR BERYLLIUM, BE IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		2.00	1.60	0.80	0.60	0.06	0.04
LAB/AN	LAB REJECTED						
11		1.96	1.56	0.79	0.52	0.05	0.05
21		1.78	1.45	0.77	0.58	0.06	0.04
32	*	1.68*	1.36*	0.70*	0.54*	0.05*	0.03*
41		1.75	1.40	0.66*	0.54	0.05	0.03
51		1.92	1.55	0.78	0.59	0.06	0.04
61		1.94	1.60	0.84	0.60	0.05	0.04
71		1.89	1.52	0.77	0.59	0.07	0.05
81		1.99	1.60	0.78	0.60	0.06	0.04
91		1.96	1.61	0.82	0.62	0.06	0.04

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR BERYLLIUM, BE IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		2.00	1.60	0.80	0.60	0.06	0.04
LAB/AN	LAB REJECTED						
11		1.90	1.51	0.78	0.58	0.05	0.03
21		1.89	1.51	0.78	0.59	0.06	0.04
32		1.81	1.46	0.75	0.56	0.05	0.03
41		1.81	1.49	0.71	0.57	0.06	0.02
51		1.94	1.55	0.75	0.54	0.05	0.04
61		1.97	1.64	0.81	0.59	0.04	0.02
71		1.91	1.55	0.77	0.58	0.06	0.04
81	*	2.03*	1.65*	0.81*	0.61*	0.06*	0.04*
91		1.96	1.60	0.80	0.61	0.06	0.04

RAW DATA FOR BERYLLIUM, BE IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		2.00	1.60	0.80	0.60	0.06	0.04
LAB/AN	LAB REJECTED						
11		1.90	1.54	0.79	0.58	0.06	0.04
21		1.86	1.48	0.76	0.58	0.06	0.04
32	*	1.77*	1.43*	0.72*	0.54*	0.05*	0.03*
41		1.74	1.43	0.70*	0.55	0.06	0.04
51		1.97	1.58	0.78	0.58	0.07	0.04
61	*	2.62*	2.14*	1.00*	0.82*	0.07*	0.05*
71		1.89	1.52	0.78	0.59	0.07	0.04
81		1.98	1.58	0.76	0.57	0.06	0.04
91		1.97	1.60	0.79	0.59	0.06	0.04

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR BERYLLIUM, BE IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		2.00	1.60	0.80	0.60	0.06	0.04
LAB/AN	LAB REJECTED						
11		1.99	1.61	0.79	0.60	0.05	0.03
21	*	2.11*	1.66*	0.84*	0.63*	0.06*	0.04*
32		1.90	1.54	0.76	0.57	0.05	0.04
41	*	1.85*	1.49*	0.73*	0.52*	0.05*	0.03*
51		1.95	1.58	0.75	0.54	0.08	0.04
61		2.01	1.57	0.74	0.58	0.04	0.03
71		2.00	1.55	0.79	0.61	0.07	0.04
81		2.00	1.58	0.77	0.58	0.06	0.04
91		2.06	1.65	0.85	0.63	0.06	0.04

RAW DATA FOR BERYLLIUM, BE IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		2.00	1.60	0.80	0.60	0.06	0.04
LAB/AN	LAB REJECTED						
11		2.02	1.54	0.78	0.58	0.06	0.03
21	*	2.11*	1.70*	0.35*	0.64*	0.07*	0.05*
32		1.88	1.50	0.75	0.56	0.05	0.04
41		1.39	1.52	0.73	0.55	0.06	0.05
51		1.99	1.62	0.77	0.56	0.06	0.04
61		1.85	1.54	0.80	0.61	0.05	0.03
71		2.00	1.60	0.78	0.60	0.06	0.04
81		2.09	1.67	0.80	0.60	0.07	0.04
91		2.10	1.68	0.83	0.61	0.06	0.03

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR CALCIUM, CA IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		300.00	270.00	195.00	150.00	105.00	90.00
LAB/AN	LAB REJECTED						
11		264.00	236.00	178.00	144.00	108.00	92.20
21		212.00	213.00	169.00	136.00	109.00	92.40
31		276.00	253.00	182.00	135.00	98.00	81.90
42		298.00	273.00	210.00	157.00	126.00	105.00
51		326.56	296.77	222.13	170.97	123.86	102.99
61		297.00	268.00	183.00	148.00	108.00	84.60
71	*	430.00*	392.00*	275.00*	216.00*	149.00*	128.00*
81		292.00	262.00	191.00	145.00	106.00	85.30
91		274.00	257.00	184.00	149.00	96.00	91.00

RAW DATA FOR CALCIUM, CA IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		300.00	270.00	195.00	150.00	105.00	90.00
LAB/AN	LAB REJECTED						
11	*	221.00*	197.00*	157.00*	117.00*	88.20*	77.60*
21		251.00	223.00	181.00	143.00	89.20	87.40
31		263.00	223.00	175.00	135.00	90.90	75.90
42	*	370.00*	363.00*	300.00*	249.00*	205.00*	204.00*
51		328.38	292.40	209.33	172.93	115.29	97.59
61		261.00	256.00	184.00	143.00	93.80	89.80
71	*	470.00*	407.00*	306.00*	259.00*	142.00*	134.00*
81		305.00	264.00	192.00	160.00	117.00	93.00
91		365.00	337.00	264.00*	223.00	181.00*	164.00*

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR CALCIUM, CA IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		75.00	60.00	36.00	30.00	27.00	24.00
LAB/AN	LAB REJECTED						
11		69.30	54.50	31.60	26.30	25.10	22.50
21		58.60	52.70	35.00	30.20	27.90	25.90
31		72.30	57.20	35.30	29.50	26.10	24.30
42		71.10	59.20	33.60	28.20	24.10	21.60
51		83.01	40.59	26.37	22.95	24.99	22.67
61		77.60	63.40	36.90	30.40	28.90	26.40
71	*	107.00*	87.40*	51.60*	43.60*	40.50*	35.60*
81		72.10	60.40	34.10	26.10	26.20	22.60
91		80.69	64.69	43.40	28.60	25.00	23.10

RAW DATA FOR CALCIUM, CA IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		75.00	60.00	36.00	30.00	27.00	24.00
LAB/AN	LAB REJECTED						
11	*	59.20*	56.00*	33.00*	25.50*	25.10*	21.80*
21	*	43.50*	45.50*	30.80*	25.60*	24.40*	24.00*
31		63.80	57.80	33.30	25.50	25.30	22.70
42		73.30	73.30	37.30	31.50	25.10	22.20
51		75.84	70.30	42.00	31.38	33.77	31.26
61		70.50	70.40	39.90	29.80	29.40	26.40
71	*	94.80*	88.90*	52.10*	42.80*	38.20*	34.30*
81		65.00	62.20	34.60	26.50	26.60	23.00
91		70.60	66.20	37.00	30.20	27.20	26.40

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR CALCIUM, CA IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		27.00	24.00	15.00	12.00	9.00	6.00
LAB/AN	LAB REJECTED						
11		24.50	21.70	13.50	10.50	8.70	5.30
21		14.70	13.30	9.74	8.51	7.53	5.24
31		23.50	21.90	14.30	11.60	8.74	6.07
42		21.20	18.90	12.40	11.00	8.51	5.78
51	*	12.37*	12.61*	9.25*	7.81*	7.25*	4.83*
61		33.70	21.80	10.80	8.94	5.47*	3.66*
71	*	38.00*	33.60*	21.70*	17.60*	13.00*	9.24*
81		29.00	24.70	15.20	12.10	8.97	6.15
91		31.10	26.90	15.90	11.90	8.10	5.60

RAW DATA FOR CALCIUM, CA IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		27.00	24.00	15.00	12.00	9.00	6.00
LAB/AN	LAB REJECTED						
11		25.60	21.60	14.60	11.00	7.95	6.45
21	*	8.29*	7.68*	5.06*	4.15*	3.72*	2.45*
31		22.30	20.60	13.90	10.70	8.30	5.83
42		18.00	17.10	11.40	8.32	6.82	3.96
51		8.84	8.72	6.06	5.12	4.20	2.84
61		35.40	33.50	9.87	4.45	4.47	2.31
71	*	38.40*	33.60*	20.30*	16.30*	11.90*	8.39*
81		28.20	25.30	16.20	12.70	9.14	6.43
91	*	35.70*	30.10*	19.30*	15.30*	11.50*	8.60*

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR CADMIUM, CD IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.86	1.49	0.75	0.56	0.06	0.04
LAB/AN	LAB REJECTED						
11		1.83	1.45	0.73	0.54	0.05	0.03
21		1.77	1.43	0.73	0.55	0.05	0.04
32		1.85	1.49	0.74	0.55	0.06	0.04
41		1.81	1.46	0.69	0.54	0.08	0.06
51		1.87	1.55	0.79	0.58	0.06	0.04
61	*	1.59*	1.26*	0.60*	0.49*	0.05*	0.03*
71		1.82	1.41	0.70	0.53	0.06	0.03
81		1.92	1.56	0.77	0.60	0.06	0.04
91		1.90	1.50	0.80	0.60	0.10	0.00

RAW DATA FOR CADMIUM, CD IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.86	1.49	0.75	0.56	0.06	0.04
LAB/AN	LAB REJECTED						
11		1.81	1.45	0.73	0.53	0.05	0.03
21		1.78	1.43	0.72	0.54	0.05	0.04
32		1.81	1.43	0.70	0.53	0.04	0.02
41		1.84	1.38	0.74	0.54	0.07	0.07
51		1.88	1.57	0.79	0.59	0.06	0.04
61	*	1.55*	1.27*	0.68*	0.47*	0.05*	0.03*
71		1.86	1.43	0.78	0.54	0.06	0.04
81		1.98	1.55	0.77	0.59	0.06	0.04
91	*	2.00*	1.60*	0.80*	0.60*	0.10*	0.10*

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CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR CADMIUM, CD IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.86	1.49	0.75	0.56	0.06	0.04
LAB/AN	LAB REJECTED						
11		1.83	1.46	0.73	0.54	0.05	0.03
21		1.79	1.43	0.72	0.54	0.06	0.04
32		1.86	1.47	0.74	0.55	0.06	0.04
41		1.74	1.38	0.74	0.51	0.06	0.06
51		1.88	1.56	0.78	0.57	0.05	0.03
61	*	1.47*	1.24*	0.58*	0.46*	0.04*	0.03*
71		1.84	1.57	0.76	0.56	0.06	0.04
81	*	1.95*	1.55*	0.77*	0.58*	0.06*	0.04*
91		1.90	1.50	0.80	0.60	0.03*	0.01

RAW DATA FOR CADMIUM, CD IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.86	1.49	0.75	0.56	0.06	0.04
LAB/AN	LAB REJECTED						
11		1.68	1.38	0.71	0.52	0.05	0.03
21		1.76	1.42	0.71	0.55	0.05	0.03
32		1.82	1.46	0.72	0.54	0.05	0.03
41		1.80	1.51	0.75	0.52	0.06	0.06
51		1.92	1.58	0.82	0.59	0.06	0.04
61	*	1.48*	1.29*	0.63*	0.44*	0.04*	0.03*
71		1.88	1.57	0.76	0.54	0.06	0.04
81		1.96	1.60	0.77	0.58	0.06	0.03
91		2.00	1.60	0.80	0.60	0.10*	0.00

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CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR CADMIUM, CD IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.86	1.49	0.75	0.56	0.56	0.04
LAB/AN	LAB REJECTED						
11		1.80	1.44	0.71	0.54	0.05	0.03
21		1.79	1.44	0.73	0.55	0.06	0.04
32		1.84	1.47	0.73	0.55	0.05	0.04
41		1.82	1.50	0.74	0.54	0.06	0.06*
51		1.90	1.56	0.80	0.59	0.06	0.04
61	*	1.54*	1.24*	0.59*	0.46*	0.04*	0.03*
71		1.82	1.39	0.70	0.53	0.06	0.03
81		1.96	1.55	0.76	0.58	0.06	0.03
91	*	1.90*	1.60*	0.80*	0.60*	0.10*	0.10*

RAW DATA FOR CADMIUM, CD IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.86	1.49	0.75	0.56	0.56	0.04
LAB/AN	LAB REJECTED						
11		1.79	1.38	0.69	0.52	0.05	0.04
21		1.77	1.41	0.71	0.54	0.05	0.03
32		1.82	1.44	0.72	0.54	0.05	0.04
41		1.91	1.57	0.78	0.60	0.09*	0.08*
51	*	1.91*	1.59*	0.81*	0.61*	0.06*	0.04*
61	*	1.50*	1.24*	0.66*	0.47*	0.04*	0.03*
71		1.83	1.39	0.69	0.52	0.05	0.03
81		1.92	1.57	0.78	0.57	0.06	0.04
91	*	1.90*	1.60*	0.80*	0.60*	0.10*	0.10*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR COBALT, CO IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPLL 5	AMPUL 6
INCREMENT IN MG/L		6.00	4.80	3.50	2.40	1.20	0.96
LAB/AN	LAB REJECTED						
11		6.05	4.83	3.62	2.41	1.22	0.98
21		5.98	4.98	3.63	2.39	1.21	0.94
32		5.89	4.76	3.54	2.34	1.17	0.94
42		6.17	5.30*	3.86	2.58	1.15	1.04
51		6.06	4.84	3.79	2.55	1.26	1.02
61	*	6.12*	4.60*	3.10*	2.19*	1.16*	0.88*
71		6.12	4.90	3.44	2.33	1.22	0.98
81	*	6.43*	5.14*	3.90*	2.81*	1.32*	1.03*
91		5.99	4.75	3.59	2.40	1.22	0.92

RAW DATA FOR COBALT, CO IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPLL 5	AMPUL 6
INCREMENT IN MG/L		6.00	4.80	3.50	2.40	1.20	0.96
LAB/AN	LAB REJECTED						
11		6.21	4.86	3.72	2.50	1.20	0.98
21	*	7.08*	5.63*	4.21*	2.87*	1.31*	1.11*
32	*	5.89*	4.63*	3.52*	2.49*	1.15*	0.94*
42		6.41	5.25	3.63	2.75	1.36	0.94
51		6.21	4.79	3.80	2.57	1.26	1.00
61	*	5.52*	4.65*	3.74*	2.20*	1.00*	0.94*
71		5.83	4.91	3.59	2.35	1.17	0.98
81		6.82	5.33	3.94	2.83	1.27	1.35*
91		6.73	5.33	3.96	2.65	1.19	0.98

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR COBALT, CO IN DISTILLED WATER 1

LAB/AN	LAB REJECTED	AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		6.00	4.80	3.00	2.40	0.60	0.36
11		6.30	5.20	3.04	2.41	0.65	0.36
21		6.12	5.09	3.07	2.44	0.61	0.37
32	*	5.46*	4.27*	2.66*	2.07*	0.48*	0.28*
42		5.73	4.71	3.11	2.58	0.49*	0.20*
51	*	6.46*	5.20*	3.28*	2.57*	0.63*	0.36*
61		5.73	4.77	2.74	2.33	0.58	0.37
71		5.80	4.40	3.00	2.35	0.60	0.36
81		6.48	5.06	3.28	2.54	0.63	0.35
91		6.16	4.90	3.09	2.49	0.63	0.35

RAW DATA FOR COBALT, CO IN BACKGROUND WATER 2

LAB/AN	LAB REJECTED	AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		6.00	4.80	3.00	2.40	0.60	0.36
11		5.40	4.40	2.98	2.30	0.58	0.37
21		5.98	4.98	3.06	2.42	0.61	0.35
32	*	5.61*	4.44*	2.75*	2.12*	0.51*	0.27*
42		6.02	5.09	2.88	2.24	0.51*	0.52*
51	*	6.53*	5.25*	3.24*	2.58*	0.66*	0.38*
61		5.61	4.86	2.88	2.21	0.63	0.36
71		6.20	5.00	3.02	2.38	0.64	0.38
81	*	6.42*	5.28*	3.27*	2.59*	0.64*	0.39*
91		6.02	4.82	3.10	2.44	0.61	0.37

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR COBALT, CO IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		60.00	48.00	30.00	24.00	18.00	12.00
LAB/AN	LAB REJECTED						
11		58.50	46.30	28.70	23.30	17.70	11.70
21	*	72.50*	54.80*	34.80*	27.40*	20.50*	13.80*
32		64.40	51.40	29.40	23.00	17.30	11.70
42	*	58.20*	39.10*	28.40*	22.70*	17.20*	11.40*
51		64.59	50.01	31.85	25.14	19.49	12.66
61		58.50	49.80	27.80	23.40	17.20	12.40
71	*	56.00*	44.30*	28.00*	21.30*	16.40*	11.10*
81		66.30	51.20	32.50	25.80	19.50	12.80
91		66.50	53.00	33.40	25.60	20.40	13.60

RAW DATA FOR COBALT, CO IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		60.00	48.00	30.00	24.00	18.00	12.00
LAB/AN	LAB REJECTED						
11		63.00	48.60	32.30	26.80	21.10	15.10
21		71.20	66.30*	38.10	28.60	20.70	14.80
32		57.70	49.20	34.90	27.30	19.60	13.10
42	*	72.20*	63.50*	42.50*	40.20*	25.60*	19.80*
51		64.98	53.54	32.95	26.87	20.25	13.43
61		56.40	48.30	32.70	26.90	20.70	12.00
71	*	60.70*	48.60*	31.30*	26.20*	16.30*	11.10*
81		63.50	53.60	31.40	26.10	20.60	12.60
91		68.60	53.10	33.50	26.70	20.00	13.30

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR CHROMIUM, CR IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		10.50	8.75	7.00	4.33	0.61	0.44
LAB/AN	LAB REJECTED						
11	*	6.61*	5.16*	6.67*	2.92*	0.41*	0.27*
21		11.30	9.40	7.55	4.66	0.64	0.47
31		11.20	9.56	7.73	4.85	0.67	0.48
41	*	14.20*	11.50*	8.88*	5.56*	0.69*	0.47*
51		12.18	9.95	8.03	4.92	0.85	0.56
61		12.50	9.97	6.91	4.58	0.69	0.43
71		10.30	8.65	7.03	4.60	0.57	0.43
81		11.70	9.86	7.84	5.04	0.69	0.51
91		8.95	7.66	6.48	4.06	0.61	0.44

RAW DATA FOR CHROMIUM, CR IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		10.50	8.75	7.00	4.33	0.61	0.44
LAB/AN	LAB REJECTED						
11	*	8.01*	6.81*	5.50*	3.37*	0.50*	0.33*
21		11.30	9.53	7.60	4.75	0.66	0.48
31		11.00	9.18	7.38	4.77	0.63	0.45
41	*	14.80*	12.00*	8.58*	5.62*	0.70*	0.49*
51		12.26	9.72	7.87	4.70	0.64	0.47
61		12.70	9.85	8.38	4.59	0.62	0.54
71		10.70	9.09	6.99	4.06	0.51	0.38
81		12.20	9.99	7.95	5.07	0.68	0.48
91		8.51	7.10*	5.81	3.60	0.59	0.42

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR CHROMIUM, CR IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		10.50	8.75	7.00	4.38	0.61	0.44
LAB/AN	LAB REJECTED						
11	*	11.10*	8.48*	6.60*	3.58*	0.35*	0.24*
21		11.20	9.31	7.39	4.61	0.63	0.43
31		11.00	9.15	7.34	4.64	0.68	0.50
41		13.70*	11.40	8.35*	5.27*	0.63	0.44
51	*	14.39*	12.70*	11.00*	4.69*	0.72*	0.55*
61		11.50	10.10	7.51	4.64	0.66	0.50
71		10.30	8.65	7.03	4.42*	0.57	0.40
81		10.90	9.32	7.41	4.61	0.65	0.46
91	*	9.36*	7.63*	6.66*	4.12*	0.60*	0.38*

RAW DATA FOR CHROMIUM, CR IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		10.50	8.75	7.00	4.38	0.61	0.44
LAB/AN	LAB REJECTED						
11	*	8.96*	6.78*	5.49*	2.98*	0.34*	0.24*
21		11.60	9.73	7.68	4.84	0.68	0.49
31		10.90	9.27	7.27	4.62	0.70	0.52
41		13.80	11.40	8.28	5.30	0.69	0.44
51	*	17.71*	16.22*	14.41*	4.89*	0.77*	0.55*
61		11.40	10.20	8.09	4.64	0.62	0.50
71		10.30	8.65	7.03	4.12	0.60	0.40
81		11.40	9.78	7.55	4.76	0.69	0.51
91		9.13	7.10	5.74	3.08	3.12*	0.42

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR CHROMIUM, CR IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		10.50	8.75	7.00	4.33	0.61	0.44
LAB/AN	LAB REJECTED						
11	*	6.61*	5.16*	6.67*	2.92*	0.41*	0.27*
21		11.30	9.40	7.55	4.66	0.64	0.47
31		11.20	9.56	7.73	4.85	0.67	0.48
41	*	14.20*	11.50*	8.88*	5.56*	0.69*	0.47*
51		12.18	9.95	8.03	4.92	0.85	0.56
61		12.50	9.97	6.91	4.58	0.69	0.43
71		10.30	8.65	7.03	4.60	0.57	0.43
81		11.70	9.86	7.84	5.04	0.69	0.51
91		8.95	7.66	6.48	4.06	0.61	0.44

RAW DATA FOR CHROMIUM, CR IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		10.50	8.75	7.00	4.33	0.61	0.44
LAB/AN	LAB REJECTED						
11	*	8.01*	6.81*	5.50*	3.37*	0.50*	0.33*
21		11.30	9.53	7.60	4.75	0.66	0.48
31		11.00	9.18	7.38	4.77	0.63	0.45
41	*	14.80*	12.00*	8.58*	5.62*	0.70*	0.49*
51		12.26	9.72	7.87	4.70	0.64	0.47
61		12.70	9.85	8.38	4.59	0.62	0.54
71		10.70	9.09	6.99	4.06	0.51	0.38
81		12.20	9.99	7.95	5.07	0.68	0.48
91		8.51	7.10*	5.81	3.60	0.59	0.42

* = REJECTED
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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR CHROMIUM, CR IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		43.30	35.00	26.30	21.90	17.50	13.10
LAB/AN	LAB REJECTED						
11		45.20	37.20	26.60	22.60	20.70	17.80
21		45.80	36.90	27.80	22.90	18.50	13.90
31		50.80	37.80	27.50	23.80	18.70	14.40
41	*	58.00*	56.80*	32.20*	28.80*	22.90*	16.90*
51		46.78	37.40	27.98	23.20	18.73	14.79
61		46.70	38.60	30.70	26.30*	19.90	17.00
71		49.40	37.30	28.90	23.70	19.70	14.10
81		49.50	38.90	29.30	24.20	19.00	14.10
91	*	42.40*	34.50*	25.80*	21.00*	18.40*	14.10*

RAW DATA FOR CHROMIUM, CR IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		43.80	35.00	26.30	21.90	17.50	13.10
LAB/AN	LAB REJECTED						
11		50.30	37.20	25.30	23.90	13.60	11.40
21		47.30	38.50	27.70	23.00	18.10	13.60
31		45.60	38.30	28.60	22.30	19.00	14.40
41	*	58.80*	49.90*	37.10*	31.60*	25.50*	16.60*
51		60.15*	39.44	28.97	23.39	18.20	13.29
61		45.70	37.40	35.60	28.70	24.30	16.90
71		49.40	38.00	31.80	25.70	20.80	15.80
81		46.80	40.30	30.10	24.80	19.10	12.20
91		48.20	39.00	29.90	35.60*	21.60	17.20

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR COPPER, CU IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		5.00	4.00	2.00	1.50	0.20	0.15
LAB/AN	LAB REJECTED						
11		4.98	4.00	2.02	1.51	0.20	0.16
21		4.86	3.92	1.96	1.45	0.21	0.16
32		5.08	4.08	2.05	1.52	0.21	0.16
42		4.81	3.90	1.93	1.41	0.18	0.16
51		4.75	3.78	1.92	1.45	0.19	0.15
61	*	4.56*	3.74*	1.74*	1.35*	0.18*	0.14*
71		4.83	3.79	1.96	1.45	0.20	0.09*
81	*	5.17*	4.12*	2.08*	1.61*	0.22*	0.17*
91	*	5.50*	4.30*	2.10*	1.60*	0.20*	0.20*

RAW DATA FOR COPPER, CU IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		5.00	4.00	2.00	1.50	0.20	0.15
LAB/AN	LAB REJECTED						
11		4.91	3.98	2.04	1.50	0.20	0.16
21		4.82	3.90	1.94	1.43	0.19	0.15
32		4.99	3.97	1.97	1.49	0.20	0.15
42		4.93	3.90	1.87	1.41	0.22	0.16
51		4.76	3.83	1.93	1.47	0.21	0.16
61		4.33*	3.70	2.00	1.34	0.18	0.15
71		4.94	3.84	1.97	1.50	0.19	0.14
81	*	5.31*	4.10*	2.06*	1.60*	0.22*	0.16*
91	*	5.40*	4.40*	2.20*	1.60*	0.20*	0.20*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR COPPER, CU IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		5.00	4.00	2.00	1.50	0.21	0.15
LAB/AN	LAB REJECTED						
11		4.96	3.97	1.99	1.48	0.20	0.15
21		4.92	3.98	1.95	1.47	0.20	0.15
32		5.10	4.05	2.01	1.50	0.20	0.15
42		5.06	3.94	1.87	1.41	0.16*	0.13
51		4.85	3.90	1.93	1.46	0.20	0.15
61	*	4.07*	3.61*	1.69*	1.31*	0.17*	0.13*
71		4.87	3.88	1.93	1.47	0.21*	0.16
81	*	5.24*	4.11*	2.14*	1.56*	0.21*	0.16*
91	*	5.30*	4.30*	2.10*	1.60*	0.20*	0.20*

RAW DATA FOR COPPER, CU IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		5.00	4.00	2.00	1.50	0.21	0.15
LAB/AN	LAB REJECTED						
11		4.58	3.73	1.91	1.43	0.19	0.14
21		4.79	3.89	1.90	1.44	0.19	0.15
32		5.03	4.04	1.99	1.48	0.19	0.14
42		4.79	3.97	1.88	1.44	0.16	0.13
51		4.94	3.94	1.96	1.50	0.21	0.16
61	*	4.01*	3.77*	1.86*	1.29*	0.17*	0.16*
71		4.95	3.85	1.96	1.49	0.21	0.16
81	*	5.24*	4.28*	2.11*	1.60*	0.22*	0.16*
91	*	5.40*	4.30*	2.10*	1.60*	0.20*	0.20*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR COPPER, CU IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		5.00	4.00	2.00	1.50	0.20	0.15
LAB/AN	LAB REJECTED						
11		4.94	3.94	1.98	1.50	0.21	0.15
21		5.04	3.98	1.99	1.47	0.21	0.15
32		5.12	4.09	2.04	1.53	0.20	0.16
42		4.96	3.90	1.93	1.44	0.19	0.15
51		4.83	3.83	1.95	1.43	0.20	0.15
61	*	4.52*	3.76*	1.74*	1.36*	0.17*	0.14*
71		4.90	3.84	1.93	1.45	0.22	0.16
81	*	5.37*	4.14*	2.07*	1.59*	0.21*	0.16*
91	*	5.40*	4.30*	2.20*	1.60*	0.20*	0.20*

RAW DATA FOR COPPER, CU IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		5.00	4.00	2.00	1.50	0.20	0.15
LAB/AN	LAB REJECTED						
11		4.88	3.76	1.90	1.46	0.19	0.16
21		4.93	3.95	1.94	1.46	0.18	0.14
32		5.09	4.08	2.09	1.57	0.24	0.20*
42		5.01	3.96	1.90	1.48	0.21	0.14
51		4.80	3.89	1.92	1.49	0.21	0.16
61	*	4.29*	3.66*	1.93*	1.41*	0.18*	0.13*
71		5.01	3.73*	1.89	1.42	0.20	0.15
81		5.25	4.18	2.11	1.58	0.21	0.16
91	*	5.40*	4.30*	2.20*	1.60*	0.20*	0.20*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR IRON, FE IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		11.30	9.00	6.75	4.50	3.60	2.70
LAB/AN	LAB REJECTED						
11		10.80	8.24	6.30	4.16	3.32	2.48
21		10.00	7.98	6.27	4.29	3.34	2.52
32		10.90	8.82	6.71	4.48	3.49	2.59
41		10.40	8.41	6.03	4.66	3.64	2.45
51		10.68	8.63	6.75	4.20	3.28	2.47
61	*	9.01*	7.21*	5.05*	3.47*	2.68*	2.08*
71		10.40	8.42	6.31	4.25	3.29	2.50
81	*	11.70*	9.62*	7.07*	4.74*	3.76*	2.86*
91		11.41	9.51	7.13	4.28	3.57	2.71

RAW DATA FOR IRON, FE IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		11.30	9.00	6.75	4.50	3.60	2.70
LAB/AN	LAB REJECTED						
11		11.60	8.70	7.59	4.95	4.14	2.94
21		9.61	7.89	6.84	4.41	3.65	2.78
32		11.00	8.81	7.36	4.75	3.72	2.84
41		11.70	10.20	7.90	5.24	3.85	2.80
51		10.84	8.42	7.21	4.69	3.61	2.72
61	*	8.63*	7.56*	6.54*	3.55*	2.74*	2.57*
71		10.70	8.51	6.73	4.76	3.51	2.76
81		11.80	9.41	7.60	4.86	3.84	2.95
91	*	13.12*	10.33*	8.75*	5.48*	4.35*	2.79*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR IRON, FE IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		22.50	18.00	13.50	11.30	9.00	6.75
LAB/AN	LAB REJECTED						
11		21.90	16.40	13.80	10.90	10.30	7.82
21		20.80	16.90	13.10	10.90	9.12	6.96
32		22.30	17.60	13.30	10.90	8.66	6.39
41	*	24.20*	20.50*	14.30*	12.10*	9.98*	6.90*
51		22.41	17.71	13.09	10.99	8.80	6.56
61	*	18.10*	15.10*	10.90*	9.35*	7.13*	5.38*
71		20.90	17.00	12.60	10.80	8.87	7.45
81		23.80	18.50	14.30	11.40	9.49	7.09
91		23.89	19.70	14.01	11.88	9.58	7.37

RAW DATA FOR IRON, FE IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		22.50	18.00	13.50	11.30	9.00	6.75
LAB/AN	LAB REJECTED						
11		17.30	14.00	11.50	10.00	8.20	6.36
21		18.30	17.30	12.10	10.70	8.93	6.42
32		20.60	19.40	13.40	11.00	8.82	6.49
41		21.00	21.60	13.30	11.20	9.31	6.91
51		20.95	19.31	12.87	10.86	8.53	6.55
61	*	16.90*	16.40*	11.40*	8.53*	6.90*	5.17*
71		19.60	17.40	12.10	9.86	7.32	5.43
81		21.30	20.80	13.30	10.90	8.99	7.03
91		22.45	20.40	14.11	12.53	9.36	6.20

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR IRON, FE IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		11.30	9.00	6.75	4.50	3.60	2.70
LAB/AN	LAB REJECTED						
11		10.80	8.24	6.30	4.16	3.32	2.48
21		10.00	7.98	6.27	4.29	3.34	2.52
32		10.90	8.82	6.71	4.48	3.49	2.59
41		10.40	8.41	6.03	4.66	3.64	2.45
51		10.68	8.63	6.75	4.20	3.28	2.47
61	*	9.01*	7.21*	5.05*	3.47*	2.68*	2.08*
71		10.40	8.42	6.31	4.25	3.29	2.50
81	*	11.70*	9.62*	7.07*	4.74*	3.76*	2.86*
91		11.41	9.51	7.13	4.28	3.57	2.71

RAW DATA FOR IRON, FE IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		11.30	9.00	6.75	4.50	3.60	2.70
LAB/AN	LAB REJECTED						
11		11.60	8.70	7.59	4.95	4.14	2.94
21		9.61	7.89	6.84	4.41	3.65	2.78
32		11.00	8.81	7.36	4.75	3.72	2.84
41		11.70	10.20	7.90	5.24	3.85	2.80
51		10.84	8.42	7.21	4.69	3.61	2.72
61	*	8.63*	7.56*	6.54*	3.55*	2.74*	2.57*
71		10.70	8.51	6.73	4.76	3.51	2.76
81		11.80	9.41	7.60	4.86	3.84	2.95
91	*	13.12*	10.33*	8.75*	5.48*	4.35*	2.79*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR IRON, FE IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		11.30	9.00	6.75	4.50	3.60	2.70
LAB/AN	LAB REJECTED						
11	*	12.30*	10.10*	7.77*	5.12*	4.18*	3.28*
21		9.84	7.86	6.20	4.14	3.35	2.56
32		10.90	8.85	6.67	4.48	3.58	2.68
41		11.20	8.98	6.49	4.25	3.25	2.72
51		11.02	8.86	6.90	4.21	3.45	2.61
61	*	8.41*	7.33*	5.51*	3.46*	2.58*	2.09*
71		9.77	7.91	6.05	3.69	2.83	2.11*
81	*	11.50*	9.44*	7.12*	4.75*	3.84*	2.87*
91		10.47	8.60	6.84	3.95	3.28	2.53

RAW DATA FOR IRON, FE IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		11.30	9.00	6.75	4.50	3.60	2.70
LAB/AN	LAB REJECTED						
11		11.60	8.23	6.70	4.66	3.32	2.35
21		8.98	7.46	5.38	3.90	3.11	2.32
32		10.20	8.42	6.53	4.34	3.26	2.50
41		10.50	8.04	6.29	4.51	3.05	2.19
51	*	11.13*	9.22*	7.01*	4.78*	3.65*	2.42*
61	*	8.38*	6.81*	6.04*	3.80*	2.89*	1.87*
71		9.50	7.71	6.11	3.96	3.3[illegible]	1.[illegible]
81	*	12.10*	9.[illegible]*	7.30*	4.72*	3.6[illegible]*	2.5[illegible]*
91		11.11	8.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR POTASSIUM, K IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		34.50	27.60	18.20	14.80	9.40	7.00
LAB/AN	LAB REJECTED						
11	*	41.00*	33.00*	21.00*	17.00*	9.90*	7.70*
21		38.10	29.80	19.90	15.90	10.50	7.77
31		32.80	27.00	16.80	13.70	8.65	6.43
42		36.80	26.60	15.70	13.40	9.86	7.29
51	*	33.92*	26.80*	17.93*	12.48*	7.72*	5.91*
61		32.40	26.60	18.10	15.20	9.21	6.26
71		39.00	30.10	18.70	15.60	9.15	6.87
81		34.20	27.10	18.30	15.20	9.31	7.00
91		39.70	35.50	21.50	16.50	9.52	6.43

RAW DATA FOR POTASSIUM, K IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		34.50	27.60	18.20	14.80	9.40	7.00
LAB/AN	LAB REJECTED						
11		34.00	27.00	19.00	14.00	8.10	6.70
21		40.10	30.30	19.60	16.10	9.51	7.96
31	*	30.00*	24.30*	15.70*	13.90*	7.77*	6.24*
42		31.30	35.30	16.10	17.10	10.10	5.74
51		35.36	27.65	18.65	15.58	7.59	5.94
61		26.70	30.00	22.90	16.30	9.41	8.65
71		43.20	39.80	21.20	14.90	9.04	7.34
81		34.30	27.00	18.20	14.00	8.52	6.65
91	*	40.20*	34.70*	24.70*	19.20*	11.50*	12.00*

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CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR POTASSIUM, K IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		14.20	11.50	5.72	4.35	0.47	0.33
LAB/AN	LAB REJECTED						
11		14.90	11.90	5.65	3.85	0.35	0.15
21		16.30	13.80	6.52	4.70	0.43	0.35
31		13.80	10.90	5.26	4.12	0.50	0.32
42		13.00	13.00	5.43	5.07	0.43	0.35
51	*	11.72*	9.66*	4.72*	3.56*	0.32*	0.22*
61		14.40	12.40	5.74	4.07	0.47	0.31
71		15.40	12.30	6.62	6.83*	0.49	0.33
81		14.10	11.20	5.73	4.39	0.40	0.27
91		15.80	12.90	5.68	4.12	0.33	0.12

RAW DATA FOR POTASSIUM, K IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		14.20	11.50	5.72	4.35	0.47	0.33
LAB/AN	LAB REJECTED						
11	*	15.70*	12.90*	6.90*	5.10*	1.00*	0.80*
21		14.80	12.60	6.45	5.17	0.39	0.31
31		12.40	10.20	5.06	3.81	0.33	0.33
42		14.20	10.50	6.09	3.84	0.46	0.18*
51		12.25	10.12	4.86	4.11	0.42	0.32
61		14.20	12.70	5.89	3.95	0.48	0.34
71		15.10	11.60	5.76	4.58	0.48	0.30
81		13.90	11.90	6.03	4.38	0.46	0.32
91		13.80	11.90	5.42	4.26	0.54	0.29

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR POTASSIUM, K IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		14.20	11.50	5.72	4.35	0.47	0.33
LAB/AN	LAB REJECTED						
11		18.00	15.00	7.70	5.40	0.40	0.40
21		16.70	13.30	6.99	5.24	0.47	0.31
31	*	13.40*	11.40*	5.54*	3.97*	0.41*	0.26*
42		16.80	11.30	6.29	5.00	0.57	0.38
51		15.90	12.80	6.17	4.62	0.41	0.29
61	*	22.60*	19.20*	7.86*	6.06*	0.74*	0.56*
71		16.10	13.00	6.37	4.85	0.53	0.38
81		14.40	11.70	5.85	4.41	0.42	0.28
91		16.00	12.70	6.13	4.75	0.20	0.10

RAW DATA FOR POTASSIUM, K IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		14.20	11.50	5.72	4.35	0.47	0.33
LAB/AN	LAB REJECTED						
11		17.30	14.90	7.30	4.70	0.50	0.50
21		17.00	12.60	6.09	4.60	0.41	0.25
31	*	12.50*	9.98*	5.13*	3.91*	0.31*	0.33*
42		16.40	11.40	8.28	5.69	0.58	0.28
51		16.74	13.66	6.35	4.59	0.51	0.33
61	*	20.90*	19.10*	10.10*	7.14*	1.28*	0.68*
71		16.90	14.20	6.99	5.18	0.49	0.36
81	*	14.10*	11.90*	5.89*	4.25*	0.29*	0.17*
91		23.00*	15.00	6.41	4.30	0.60	0.31

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR MAGNESIUM, MG IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		125.00	113.00	62.50	50.00	37.50	30.00
LAB/AN	LAB REJECTED						
11		122.00	112.00	63.90	51.60	39.00	31.10
21		131.00	116.00	63.20	51.30	40.40	32.60
31		122.00	109.00	59.80	47.60	38.10	29.50
41		130.00	120.00	63.20	52.40	37.80	30.50
51		123.38	109.81	70.59	56.67	37.89	30.48
61	*	99.50*	91.00*	47.00*	40.30*	29.30*	22.40*
71		116.00	105.00	57.80	47.40	28.60*	23.00
81		104.00	98.50	57.50	44.00	35.70	28.90
91		115.60	108.40	60.90	49.50	36.10	34.60

RAW DATA FOR MAGNESIUM, MG IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		125.00	113.00	62.50	50.00	37.50	30.00
LAB/AN	LAB REJECTED						
11		103.00	93.00	57.60	47.80	34.60	29.20
21		125.00	108.00	63.70	48.20	36.10	29.60
31		117.00	101.00	54.90	45.50	30.10	25.20
41		137.00	126.00	66.80	56.80	36.40	28.90
51		118.41	105.03	55.87	44.68	30.42	23.89
61	*	94.80*	86.40*	50.30*	38.60*	26.10*	25.30*
71		99.80	78.30	42.40	33.70	37.90	32.80
81		109.00	104.00	55.80	46.80	32.80	30.30
91		120.70	108.40	59.70	50.00	37.00	29.20

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR MAGNESIUM, MG IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		30.00	25.50	12.50	10.00	4.50	5.00
LAB/AN	LAB REJECTED						
11		31.40	25.90	12.90	10.30	7.60	5.00
21		29.50	24.80	12.70	10.00	7.92	5.07
31		31.50	25.60	12.90	9.99	7.55	5.10
41		21.40*	17.20*	12.70	10.60	7.71	4.91
51		30.98	25.77	12.56	10.08	7.54	4.95
61	*	23.20*	20.70*	10.00*	8.30*	6.17*	4.14*
71		28.20	24.60	9.97*	7.93*	6.12*	4.22
81		26.90	23.00	11.50*	9.59	7.11	4.61
91		29.99	25.17	13.14	10.14	7.59	5.41

RAW DATA FOR MAGNESIUM, MG IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		30.00	25.50	12.50	10.00	4.50	5.00
LAB/AN	LAB REJECTED						
11		26.60	26.60	12.90	10.00	6.70	4.30
21		26.30	25.10	11.10	9.31	6.96	4.67
31		27.60	27.50	12.30	9.75	7.34	4.60
41	*	13.30*	12.30*	3.70*	5.00*	6.60*	4.60*
51		27.54	27.19	12.21	9.89	7.18	4.72
61	*	21.90*	24.80*	10.90*	6.98*	6.10*	3.78*
71		29.20	29.50	13.60	11.40*	4.80*	3.21*
81		25.70	25.40	12.30	9.10	7.00	5.00
91		27.38	27.00	12.06	9.52	7.20	4.76

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR MAGNESIUM, MG IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		30.00	25.00	12.50	10.00	7.50	5.00
LAB/AN	LAB REJECTED						
11		31.20	25.20	12.80	10.00	7.60	5.00
21		27.20	22.60	12.30	10.00	7.94	5.25
31		32.00	26.00	12.60	9.96	7.44	4.97
41		26.60	19.60	12.70	10.30	7.21	5.25
51		29.17	24.47	12.36	9.83	7.45	4.93
61	*	24.90*	21.60*	9.94*	8.47*	6.10*	4.45*
71		28.00	24.00	11.70	9.72	7.54	4.88
81		27.90	22.80	9.98*	9.33	7.23	4.66
91		30.07	24.71	12.85	10.17	7.73	5.19

RAW DATA FOR MAGNESIUM, MG IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		30.00	25.00	12.50	10.00	7.50	5.00
LAB/AN	LAB REJECTED						
11		31.20	25.40	12.60	9.30	6.80	4.70
21	*	23.40*	19.50*	10.10*	8.30*	6.24*	4.38*
31		31.30	26.50	12.30	10.10	7.65	4.97
41		23.90	21.30	11.80	8.02	7.92	4.94
51		29.53	24.49	12.27	10.21	7.88	5.36
61		23.90	20.80	11.20	8.52	6.70	4.15
71		31.20	23.60	9.32*	7.67	5.83	5.05
81		23.00	24.80	12.00	8.94	6.79	4.74
91	*	32.21*	24.89*	12.97*	10.23*	7.97*	5.27*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR MANGANESE, MN IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		3.35	2.79	0.94	0.67	0.11	0.08
LAB/AN	LAB REJECTED						
11		3.48	2.92	0.88	0.70	0.11	0.08
21	*	3.68*	3.10*	0.93*	0.74*	0.13*	0.09*
32		3.27	2.75	0.83	0.66	0.12	0.09
42		3.21	2.83	0.80	0.63	0.10	0.10
51		3.16	2.67	0.82	0.65	0.10	0.08
61		2.79	2.35	0.76	0.58	0.15	0.11
71		3.30	2.69	0.81	0.64	0.11	0.08
81		3.48	2.92	0.86	0.70	0.12	0.09
91		3.55	2.93	0.87	0.69	0.07	0.04

RAW DATA FOR MANGANESE, MN IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		3.35	2.79	0.94	0.67	0.11	0.08
LAB/AN	LAB REJECTED						
11		3.48	2.91	0.93	0.70	0.12	0.09
21	*	3.69*	3.07*	0.96*	0.72*	0.13*	0.09*
32		3.23	2.68	0.83	0.65	0.11	0.09
42		3.15	2.56	0.73	0.67	0.10	0.07
51		2.23*	2.70	0.85	0.66	0.11	0.08
61	*	2.76*	2.38*	0.35*	0.61*	0.10*	0.07*
71		3.35	2.70	0.87	0.66	0.11	0.09
81		3.60	3.01	0.89	0.70	0.11	0.09
91	*	3.57*	2.93*	0.96*	0.74*	0.13*	0.11*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR MANGANESE, MN IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		3.90	3.35	1.95	1.67	1.39	1.12
LAB/AN	LAB REJECTED						
11	*	4.26*	3.69*	2.13*	1.82*	1.47*	1.12*
21		4.18	3.59	2.07	1.77	1.46	1.18
32		3.74	3.21	1.88	1.60	1.37	1.08
42		3.27	3.80	2.07	1.74	1.32	1.23
51		3.83	3.31	1.84	1.62	1.38	1.12
61	*	3.19*	2.78*	1.53*	1.39*	1.08*	0.89*
71		3.84	3.30	1.90	1.63	1.35	1.08
81		4.16	3.40	1.98	1.69	1.41	1.08
91		4.18	3.69	2.11	1.80	1.46	1.17

RAW DATA FOR MANGANESE, MN IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		3.90	3.35	1.95	1.67	1.39	1.12
LAB/AN	LAB REJECTED						
11		3.46	3.49	2.03	1.70	1.33	1.07
21	*	3.86*	3.81*	2.08*	1.85*	1.51*	1.17*
32		3.48	3.44	1.88	1.58	7.33*	1.06
42		3.66	3.49	1.84	1.78	1.39	0.95
51		3.55	3.44	1.78	1.56	1.21	1.05
61	*	3.25*	3.64*	1.56*	1.16*	1.03*	0.78*
71		3.52	3.52	1.88	1.66	1.41	1.11
81		3.89	2.95	2.01	1.74	1.46	1.16
91		3.93	3.91	2.11	1.73	1.45	1.15

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR MANGANESE, MN IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		3.35	2.79	0.84	0.67	0.11	0.08
LAB/AN	LAB REJECTED						
11		3.53	2.99	0.90	0.68	0.14	0.06
21		3.93	3.28	0.96	0.74	0.13	0.09
32		3.32	2.80	0.85	0.68	0.14	0.12
42		3.31	2.81	0.86	0.63	0.10	0.13
51		3.23	2.77	0.80	0.64	0.10	0.07
61	*	2.76*	2.42*	0.68*	0.56*	0.11*	0.06*
71		2.99	2.57	0.77	0.60	0.11	0.08
81		3.46	2.86	0.85	0.68	0.11	0.09
91	*	3.50*	2.95*	1.04*	0.82*	0.21*	0.19*

RAW DATA FOR MANGANESE, MN IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		3.35	2.79	0.84	0.67	0.11	0.08
LAB/AN	LAB REJECTED						
11		3.44	2.79	0.88	0.72	0.13	0.08
21	*	3.81*	3.19*	0.94*	0.79*	0.11*	0.08*
32		3.27	2.72	0.79	0.62	0.08	0.06
42		3.43	2.85	0.78	0.67	0.13	0.08
51		3.26	2.79	0.81	0.66	0.10	0.08
61		2.63*	2.20*	0.73	0.55	0.08	0.06
71	*	3.09*	2.40*	0.70*	0.56*	0.08*	0.06*
81		3.49	2.89	0.85	0.68	0.11	0.08
91		3.61	3.09	0.88	0.68	0.08	0.05

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR MOLYBDENUM, MO IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.30	1.12	0.75
LAB/AN	LAB REJECTED						
11		36.20	28.00	14.40	10.50	0.85	0.52
21		42.80	33.10	17.10	12.50	1.30	0.79
31		16.50	14.70	8.70	7.03	1.31	0.90
41		43.90	34.70	17.40	13.00	1.15	0.96
51		46.82	37.87	18.01	13.03	0.81	0.27
61		33.60	26.10	11.70	9.06	0.75	0.50
71		37.80	29.10	13.60	10.30	1.05	0.71
81		35.30	28.80	15.40	11.90	1.28	0.91
91		25.11	19.52	13.14	10.17	1.12	0.60

RAW DATA FOR MOLYBDENUM, MO IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.30	1.12	0.75
LAB/AN	LAB REJECTED						
11		36.90	28.80	14.40	10.60	1.07	0.86
21		40.70	32.70	16.50	12.00	1.22	0.33
31		19.10	15.70	9.45	7.48	1.25	0.86
41		42.40	34.40	16.90	13.10	1.21	0.50
51		46.33	34.39	16.68	12.43	0.73	0.40
61		38.00	32.40	13.70	9.32	1.01	0.72
71		38.10	30.90	14.60	11.10	1.15	0.73
81		37.00	29.30	15.80	12.00	1.26	0.84
91		24.46	21.98	12.67	10.57	1.58	0.96

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR MOLYBDENUM, MO IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.20	1.12	0.75
LAB/AN	LAB REJECTED						
11		37.90	30.00	15.60	11.10	1.07	0.72
21	*	42.80*	34.10*	17.40*	12.80*	1.26*	0.79*
31		29.10	23.00	12.80	9.02	1.08	0.78
41		41.40	32.10	16.40	12.40	1.02	0.66
51		43.11	38.66	17.15	13.18	1.01	0.58
61		32.80	26.40	12.50	9.18	1.01	0.72
71		39.20	30.00	13.60	9.79	1.05	0.68
81		40.50	32.00	16.10	11.70	1.21	0.80
91		35.72	31.82	17.35	13.64	1.23	0.91

RAW DATA FOR MOLYBDENUM, MO IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.20	1.12	0.75
LAB/AN	LAB REJECTED						
11		34.50	28.00	15.60	11.20	1.17	0.74
21		41.00	32.90	16.20	12.50	1.26	0.87
31		26.30	20.10	10.20	7.65	1.23	0.82
41		43.10	34.40	16.70	12.60	1.02	0.78
51		43.46	35.52	17.73	12.95	1.23	0.79
61		33.10	28.30	13.90	8.96	0.99	0.67
71		38.50	28.20	13.50	10.20	1.13	0.77
81		40.20	33.00	16.20	12.00	1.24	0.84
91		38.47	29.35	16.89	13.31	1.48	0.94

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR MOLYBDENUM, MO IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.20	1.12	0.75
LAB/AN	LAB REJECTED						
11		39.00	30.40	15.70	11.50	1.05	0.57
21		41.80	32.80	17.20	12.70	1.35	0.87
31		42.70	34.00	17.00	12.60	1.28	0.87
41		45.50	36.60	18.30	13.60	1.09	0.87
51		46.04	38.64	18.82	12.57	1.13	0.61
61	*	33.00*	28.00*	11.00*	8.84*	0.90*	0.63*
71		37.60	28.90	13.60	10.20	1.14	0.81
81		42.40	34.60	16.90	12.70	1.30	0.89
91		48.18	37.02	21.36	15.51	1.16	0.82

RAW DATA FOR MOLYBDENUM, MO IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.20	1.12	0.75
LAB/AN	LAB REJECTED						
11		37.70	30.00	15.50	11.50	1.15	0.75
21		42.50	37.50	17.20	12.60	1.36	0.93
31		43.30	34.30	17.80	13.30	1.35	0.88
41		44.00	35.30	18.10	13.20	1.27	0.81
51		47.22	42.48	18.83	15.06	1.46	0.68
61		35.90	29.50	13.20	9.55	1.22	0.89
71	*	38.40*	29.20*	13.40*	10.00*	0.96*	0.68*
81		42.40	34.90	16.90	12.50	1.19	0.77
91	*	55.89*	44.43*	21.90*	18.76*	1.89*	1.09*

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR SODIUM, NA IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		110.00	82.50	68.80	55.00	41.30	27.50
LAB/AN	LAB REJECTED						
11		114.00	66.20	71.20	56.50	41.60	28.00
21		105.00	81.90	69.50	55.00	43.40	28.70
31		106.00	78.30	66.10	52.10	39.10	26.20
42		111.00	74.70	65.50	52.10	41.10	28.20
51		108.28	80.87	68.63	53.84	40.25	26.91
61	*	96.70*	74.60*	60.90*	48.40*	40.30*	26.30*
71		107.00	80.70	65.90	53.60	40.60	25.80
81		110.00	76.10	65.70	54.10	39.40	26.50
91	*	115.00*	99.70*	78.10*	63.40*	43.70*	27.70*

RAW DATA FOR SODIUM, NA IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		110.00	82.50	68.80	55.00	41.30	27.50
LAB/AN	LAB REJECTED						
11		103.00	75.80	67.20	51.30	36.90	27.10
21		109.00	77.30	65.40	53.50	38.30	27.20
31		102.00	76.40	63.70	53.10	36.40	26.10
42		102.00	78.30	66.80	58.50	33.20	24.00
51		108.59	79.45	67.12	54.58	38.02	26.60
61		104.00	97.60*	60.60	45.10	33.00	25.30
71		100.00	73.60	66.40	52.80	37.10	23.40
81		114.00	81.70	69.00	55.40	38.40	30.40
91	*	157.00*	129.00*	119.00*	100.00*	75.70*	65.90*

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR SODIUM, NA IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		41.30	33.00	22.00	16.50	13.80	11.00
LAB/AN	LAB REJECTED						
11	*	43.10*	34.40*	23.10*	17.10*	14.30*	11.90*
21		42.30	34.60	22.50	16.70	14.30	11.70*
31		39.90	31.90	21.00	15.80	13.10	10.40
42		42.30	33.60	21.10	16.00	13.70	9.69
51		41.45	32.18	20.75	15.31	13.02	10.24
61	*	36.60*	30.90*	20.00*	14.60*	12.70*	9.19*
71		39.10	30.40	20.30	15.40	12.80	10.10
81		39.10	31.80	21.10	15.90	13.10	10.10
91	*	43.30*	35.00*	23.30*	17.80*	15.00*	11.70*

RAW DATA FOR SODIUM, NA IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		41.30	33.00	22.00	16.50	13.80	11.00
LAB/AN	LAB REJECTED						
11		38.30	35.10	23.50	16.50	13.40	10.30
21		36.30	34.30	21.10	16.70	13.60	10.90
31		35.30	32.80	20.50	15.10	13.00	10.00
42		35.40	32.90	21.40	15.60	13.90	11.20
51		38.40	35.11	21.95	16.68	14.03	11.23
61	*	31.90*	32.60*	20.30*	13.20*	11.10*	8.01*
71	*	35.00*	31.20*	17.60*	13.50*	13.00*	8.40*
81		35.10	32.60	19.10	14.40	13.00	10.30
91	*	45.90*	44.50*	34.40*	28.90*	27.10*	19.90*

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CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR SODIUM, NA IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		2750.00	2200.00	1240.00	1100.00	688.00	550.00
LAB/AN	LAB REJECTED						
11	*	3170.00*	2440.00*	1360.00*	1270.00*	780.00*	581.00*
21		2825.00	2207.00	1243.00	1100.00	702.00	551.00
31		2770.00	2198.00	1234.00	1093.00	678.00	549.00
42		2980.00	1980.00	1310.00	962.00	774.00*	579.00
51		2843.50	2257.00	1240.90	1083.20	668.43	554.67
61		2840.00	2040.00	1370.00	1070.00	668.00	595.00
71		2630.00	2130.00	1150.00	1080.00	684.00	548.00
81		2752.00	2108.00	1208.00	1075.00	688.00	544.00
91		2860.00	2182.00	1232.00	1006.00	704.00	632.00

RAW DATA FOR SODIUM, NA IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		2750.00	2200.00	1240.00	1100.00	688.00	550.00
LAB/AN	LAB REJECTED						
11	*	3400.00*	2700.00*	1700.00*	1600.00*	1200.00*	960.00*
21		2743.00	2183.00	1186.00	1102.00	634.00	554.00
31		2783.00	2198.00	1229.00	1044.00	658.00	526.00
42		2850.00	2670.00	1600.00	1510.00	860.00	740.00*
51		2842.50	2317.50	1226.50	1144.40	699.68	542.00
61	*	2960.00*	2600.00*	1790.00*	1650.00*	1130.00*	913.00*
71		2620.00	2000.00	1010.00	1220.00	515.00	455.00*
81	*	2412.00*	1744.00*	1165.00*	1019.00*	483.00*	475.00*
91		2846.00	2080.00	1772.00	1308.00	996.00	540.00

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CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR NICKEL, NI IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		5.50	4.50	2.00	1.50	0.30	0.25
LAB/AN	LAB REJECTED						
11		5.49	4.52	2.01	1.52	0.31	0.26
21		5.36	4.47	1.97	1.47	0.30	0.24
32		5.41	4.44	1.98	1.47	0.29	0.24
41		5.76	4.53	2.10	1.57	0.32	0.25
51		5.13	4.17*	1.93	1.44	0.29	0.25
61	*	5.05*	4.11*	1.62*	1.24*	0.18*	0.18*
71		5.46	4.43	1.97	1.42	0.33	0.21
81		5.95	4.49	1.99	1.54	0.32	0.27
91		6.01	4.48	1.92	1.49	0.28	0.20

RAW DATA FOR NICKEL, NI IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		5.50	4.50	2.00	1.50	0.30	0.25
LAB/AN	LAB REJECTED						
11		5.94	4.47	2.00	1.48	0.27	0.23
21		5.43	4.51	1.92	1.47	0.27	0.25
32		5.32	4.33	1.91	1.48	0.27	0.24
41	*	5.94*	4.95*	2.11*	1.61*	0.29*	0.31*
51		5.11	4.16	1.88	1.44	0.27	0.24
61	*	5.06*	4.18*	1.79*	1.20*	0.13*	0.16*
71		5.19	4.52	2.13	1.59	0.34	0.34
81		5.73	4.58	2.01	1.56	0.28	0.27
91		5.64	4.44	1.91	1.44	0.18	0.14

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR NICKEL, NI IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		5.50	4.50	2.00	1.50	0.30	0.25
LAB/AN	LAB REJECTED						
11	*	5.87*	4.88*	2.36*	1.88*	0.39*	0.36*
21		5.34	4.41	1.99	1.47	0.32	0.24
32		5.34	4.30	1.90	1.40	0.25	0.24
41		5.76	4.61	2.14	1.46	0.25	0.25
51		5.17	4.27	1.87	1.43	0.28	0.25
61	*	4.73*	3.83*	1.60*	1.24*	0.18*	0.18*
71		5.74	4.96	2.15	1.64	0.32	0.21
81		5.35	4.42	1.94	1.46	0.30	0.27
91		5.96	4.78	2.13	1.60	0.16	0.20

RAW DATA FOR NICKEL, NI IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		5.50	4.50	2.00	1.50	0.30	0.25
LAB/AN	LAB REJECTED						
11		5.16	4.45	2.16	1.51	0.18	0.12
21		5.38	4.40	1.95	1.50	0.31	0.26
32		5.39	4.38	1.89	1.39	0.26	0.20
41		5.63	4.70	2.10	1.54	0.36	0.20
51		5.27	4.27	1.88	1.43	0.28	0.23
61		4.80	3.87	1.76	1.20*	0.22	0.17*
71		5.76	4.44	1.97	1.46	0.30	0.30
81		5.85	4.68	2.05	1.54	0.34	0.25
91		5.84	4.76	2.19	1.57	0.23	0.10

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR NICKEL, NI IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		27.50	22.50	12.50	10.00	5.50	4.50
LAB/AN	LAB REJECTED						
11		27.60	22.40	12.50	6.64*	5.49	4.47
21		26.70	21.80	12.40	9.90	5.36	4.53
32		26.30	21.90	12.30	9.89	5.41	4.52
41		28.90	24.30	12.60	10.30	5.76	4.49
51		26.87	21.75	12.06	9.69	5.13	4.40
61		25.10	22.50	13.00	10.70	5.05	4.25
71		27.40	21.50	11.80	8.53	5.46	4.27
81		26.90	22.80	12.90	10.50	5.95	4.40
91		27.50	23.00	12.60	9.80	6.01	4.57

RAW DATA FOR NICKEL, NI IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		27.50	22.50	12.50	10.00	5.50	4.50
LAB/AN	LAB REJECTED						
11		28.20	22.20	12.70	10.50	6.68	5.03
21	*	27.20*	21.50*	11.80*	9.62*	5.72*	4.57*
32		26.80	21.80	12.60	9.95	6.02	4.66
41		33.80	27.80	17.60*	13.20*	6.60	4.96
51		27.48	22.54	12.34	10.08	6.10	4.74
61		23.00	19.90	12.40	10.00	6.29	4.56
71		26.10	21.60	11.20	9.71	6.72	5.47
81		29.50	24.90	13.80	10.20	6.55	4.61
91	*	35.10*	30.30*	19.20*	16.10*	11.60*	11.40*

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR LEAD, PB IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		18.80	15.00	7.50	5.63	1.13	0.75
LAB/AN	LAB REJECTED						
11		17.70	15.00	7.72	5.74	1.15	0.76
21		19.60	15.60	7.77	5.94	1.20	0.77
31		19.10	15.30	7.60	5.69	1.21	0.82
42		21.90	15.20	8.48	6.17	1.18	0.93
51		18.89	15.25	7.84	5.86	1.22	0.83
61	*	18.10*	14.30*	6.40*	5.00*	1.09*	0.66*
71		17.40	14.70	6.67	5.40	1.21	0.71
81		19.70	15.80	7.98	6.07	1.24	0.80
91		20.41	16.71	8.32	6.21	0.95*	0.53

RAW DATA FOR LEAD, PB IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		18.80	15.00	7.50	5.63	1.13	0.75
LAB/AN	LAB REJECTED						
11		16.60	13.50	7.42	5.55	1.19	0.80
21		17.90	14.10	7.66	5.83	1.17	0.77
31		17.10	13.40	7.17	5.41	1.25	0.85
42		20.70	15.00	6.90	5.61	1.30	0.77
51		17.05	13.29	7.10	5.41	1.26	0.84
61	*	15.90*	12.60*	6.40*	4.09*	0.82*	0.55*
71		15.90	12.80	8.00	6.20*	1.20	0.84
81		18.50	14.20	7.29	5.57	1.24	0.83
91		18.48	14.41	7.50	5.51	0.85*	0.50*

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CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR LEAD, PB IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		18.80	15.00	7.50	5.63	1.13	0.75
LAB/AN	LAB REJECTED						
11		19.00	15.20	7.59	5.64	1.09	0.73
21		19.60	15.60	7.95	5.98	1.24	0.81
31		19.30	15.30	7.63	5.64	1.22	0.86
42		19.60	16.50	8.41	6.05	1.35	0.76
51		18.64	15.36	7.58	5.78	1.11	0.74
61	*	16.60*	13.90*	6.18*	5.12*	0.98*	0.37*
71		19.60	13.60	7.20	5.20	1.08	0.76
81		19.50	15.40	7.88	5.82	1.21	0.79
91	*	20.58*	16.35*	8.15*	6.22*	1.17*	0.86*

RAW DATA FOR LEAD, PB IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		18.80	15.00	7.50	5.63	1.13	0.75
LAB/AN	LAB REJECTED						
11		17.50	14.20	7.31	5.50	1.07	0.71
21		19.50	15.60	7.70	5.98	1.20	0.81
31		18.80	14.90	7.39	5.57	1.25	0.36
42	*	19.60*	16.10*	7.80*	6.17*	1.29*	0.96*
51		19.12	15.45	7.75	5.87	1.17	0.78
61	*	14.90*	14.60*	6.39*	4.47*	0.78*	0.53*
71		18.20	14.80	8.08	5.39	1.15	0.81
81		19.70	15.30	7.86	5.98	1.24	0.90
91		20.03	15.36	7.93	5.99	0.92	0.45*

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CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR LEAD, PB IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		18.80	15.00	7.50	5.63	1.13	0.75
LAB/AN	LAB REJECTED						
11		18.90	15.10	7.57	5.74	1.12	0.73
21		19.80	15.50	7.91	5.94	1.20	0.85
31		19.20	15.60	7.88	5.90	1.18	0.80
42		19.60	16.40	8.12	5.66	1.22	1.14
51		18.72	15.52	7.79	5.27	1.23	0.84
61	*	16.90*	13.90*	6.18*	4.62*	0.74*	0.69*
71		18.30	13.30*	7.04	5.19	1.04	0.74
81		19.60	15.50	7.76	5.82	1.18	0.76
91		20.67	16.40	8.34	6.19	0.82*	0.48

RAW DATA FOR LEAD, PB IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		18.80	15.00	7.50	5.63	1.13	0.75
LAB/AN	LAB REJECTED						
11		13.20	11.40	6.94	5.37	1.03	0.72
21		13.70	13.30	5.43	4.58	1.13	0.70
31		14.90	12.80	6.79	5.12	1.09	0.73
42		12.00	12.80	5.97	4.95	1.24	0.65
51		13.61	12.40	5.45	4.58	1.08	0.65
61	*	11.70*	11.10*	4.71*	3.80*	0.88*	0.68*
71	*	14.90*	13.50*	8.26*	5.66*	1.09*	0.78*
81		13.70	12.60	6.09	5.12	1.03	0.67
91		14.37	13.68	6.50	5.04	0.72*	0.33*

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR ANTIMONY, SB IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.30	1.13	0.75
LAB/AN	LAB REJECTED						
11		37.40	30.60	16.00	12.10	1.30	0.94
21		39.00	31.60	16.00	11.90	1.23	0.80
31		39.70	31.90	15.60	11.70	1.04	0.73
41	*	45.30*	34.20*	16.90*	14.00*	3.29*	4.76*
51		38.25	30.46	15.06	11.64	1.44	0.97
61		35.20	28.60	12.30*	9.99	1.35	1.13
71		39.50	31.40	16.10	11.70	1.74	1.40
81		41.70	33.20	17.20	13.00	1.40	0.96
91		40.60	32.90	16.29	12.26	1.05	0.64

RAW DATA FOR ANTIMONY, SB IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.30	1.13	0.75
LAB/AN	LAB REJECTED						
11		38.10	31.00	15.70	11.50	1.18	0.80
21		38.30	31.10	15.70	11.70	1.19	0.80
31		38.70	30.70	15.20	11.40	1.10	0.66
41	*	54.60*	40.30*	23.60*	16.50*	1.48*	1.30*
51		37.90	30.18	17.29	11.80	1.44	0.93
61	*	33.40*	25.30*	13.60*	9.67*	1.10*	0.54*
71		37.80	34.10	16.10	11.40	1.21	0.98
81		43.00	33.10	16.60	12.80	1.71	1.19
91		40.70	32.60	17.28	13.08	1.24	0.79

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR ANTIMONY, SB IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.30	1.13	0.75
LAB/AN	LAB REJECTED						
11		39.00	31.40	15.20	11.40	1.14	0.72
21		39.10	31.50	15.90	11.90	1.16	0.76
31		39.90	31.70	15.90	11.80	1.22	0.76
41		44.40	32.80	20.70*	11.80	3.29*	1.03
51		38.57	31.05	15.83	12.09	1.23	0.79
61		36.80	30.30	13.70	10.80	1.18	0.89
71		38.00	33.70	16.00	11.40	1.20	1.09
81		41.50	32.70	16.80	12.60	1.56*	0.89
91		39.98	33.22	17.38	12.56	1.02	0.90

RAW DATA FOR ANTIMONY, SB IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.30	1.13	0.75
LAB/AN	LAB REJECTED						
11		36.20	28.80	14.90	11.00	0.90	0.64
21		38.30	30.90	15.70	12.00	1.30	0.83
31		39.00	31.00	15.40	11.50	1.19	0.76
41	*	43.50*	32.30*	17.80*	14.40*	2.74*	0.84*
51		38.90	30.94	16.91	12.30	1.19	0.79
61	*	35.00*	27.60*	12.90*	9.00*	0.44*	0.24*
71		37.50	29.20	16.00	12.10	1.04	1.04
81	*	41.80*	33.70*	16.80*	12.70*	1.44*	0.99*
91		40.50	33.42	14.41	10.23	0.67	0.56

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CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR ANTIMONY, Sb IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.30	1.13	0.75
LAB/AN	LAB REJECTED						
11		37.20	30.90	15.20	11.30	1.26	0.77
21		38.00	30.40	15.50	11.70	1.19	0.76
31		39.50	31.60	15.60	11.80	1.11	0.77
41	*	51.20*	38.70*	18.20*	14.40*	4.20*	1.41*
51		38.97	30.59	15.07	11.73	1.41	0.94
61	*	34.30*	28.00*	12.20*	10.30*	0.69*	0.41*
71		39.30	34.50	16.10	11.80	1.19	0.72
81		40.70	32.20	16.30	12.00	1.13	0.89
91		40.00	33.30	17.38	12.56	1.02	0.90

RAW DATA FOR ANTIMONY, SB IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		37.50	30.00	15.00	11.30	1.13	0.75
LAB/AN	LAB REJECTED						
11		37.00	28.90	14.10*	10.60	1.42	0.84
21		37.90	30.30	15.30	11.70	1.19	0.65
31		38.70	30.70	15.40	11.30	1.01	0.66
41	*	47.40*	39.50*	20.50*	13.40*	4.10*	1.31*
51		39.52	31.45	15.58	12.27	1.27	0.91
61	*	32.50*	27.50*	13.30*	9.55*	1.11*	0.52*
71		39.50	32.60	15.90	11.70	1.26	0.81
81		39.00	32.00	15.70	11.70	0.92	0.92
91		40.10	32.90	15.33	11.17	0.78	0.60

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CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR VANADIUM, V IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		93.80	75.00	46.90	37.50	2.81	1.88
LAB/AN	LAB REJECTED						
11		80.90	63.40	43.60	35.80	2.64	1.68
21		95.20	76.60	47.70	37.80	2.90	2.00
31	*	107.00*	89.50*	56.70*	45.60*	3.40*	2.30*
42	*	70.80*	56.00*	34.30*	27.20*	2.17*	1.46*
51		94.76	73.56	47.65	49.11	2.88	1.71
61		86.60	70.30	44.80	40.70	2.60	2.08
71		97.70	76.30	46.30	35.80	2.73	1.67
81		105.00	85.00	51.90	41.80	3.00	1.90
91		116.00	93.60	60.20	47.00	2.70	1.70

RAW DATA FOR VANADIUM, V IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		93.80	75.00	46.90	37.50	2.81	1.88
LAB/AN	LAB REJECTED						
11		85.90	70.40	45.00	36.20	2.83	1.69
21		94.50	75.60	47.20	37.30	2.81	2.00
31		108.00	89.40	57.20	46.10	3.70	2.50
42	*	69.70*	52.20*	29.90*	31.60*	2.17*	1.90*
51		103.08	80.76	64.49	53.08	3.48	2.63
61		92.60	76.80	50.20	36.40	2.04	1.40
71		90.00	72.90	44.30	34.90	2.57	1.71
81		109.00	84.90	52.20	42.20	3.00	2.10
91		116.00	93.30	59.70	47.40	3.00	1.90

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CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR VANADIUM, V IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		93.80	75.00	46.90	37.50	2.81	1.88
LAB/AN	LAB REJECTED						
11		95.80	73.30	46.40	35.90	2.49	1.51
21		96.00	76.30	48.40	37.90	2.81	1.91
31		104.00	83.70	53.70	42.20	3.30	2.20
42	*	69.70*	59.90*	38.10*	30.50*	2.33*	1.08*
51		93.11	67.01	52.28	49.66	2.88	2.33
61	*	80.50*	63.50*	34.60*	32.00*	1.90*	1.20*
71		95.50	76.10	43.90	34.20	2.69	1.79
81		105.00	82.10	50.90	40.20	3.00	1.90
91	*	114.00*	86.10*	54.20*	42.40*	3.10*	1.90*

RAW DATA FOR VANADIUM, V IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		93.80	75.00	46.90	37.50	2.81	1.88
LAB/AN	LAB REJECTED						
11		86.60	68.90	45.30	35.30	2.52	1.66
21		93.60	75.70	46.80	37.50	2.90	1.91
31	*	103.00*	84.50*	53.70*	43.00*	3.40*	2.20*
42	*	74.00*	61.00*	37.30*	27.20*	2.33*	1.35*
51		98.63	74.81	58.29	50.79	2.91	2.18
61		85.10	74.40	51.90	37.20	2.39	1.67
71		95.40	75.40	45.70	35.20	2.77	1.85
81		100.00	81.10	49.30	39.50	3.00	2.00
91		117.00	87.50	55.50	45.00	3.00	1.80

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR VANADIUM, V IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		93.80	75.00	46.90	37.50	2.81	1.88
LAB/AN	LAB REJECTED						
11		93.50	74.20	46.40	37.60	2.90	1.95
21		101.60	79.20	50.40	39.40	2.90	2.00
31	*	111.00*	90.90*	57.30*	45.80*	3.60*	2.50*
42	*	81.70*	73.00*	42.50*	33.50*	2.17*	1.90*
51		96.38	88.71	45.77	46.88	3.00	2.05
61	*	87.60*	68.10*	35.20*	32.30*	2.17*	1.60*
71		96.10	74.80	45.30	35.30	2.77	2.00
81		112.00	89.90	53.70	42.40	3.10	2.00
91		116.00	91.60	58.50	45.90	2.80	1.80*

RAW DATA FOR VANADIUM, V IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		93.80	75.00	46.90	37.50	2.81	1.88
LAB/AN	LAB REJECTED						
11		93.60	70.30	45.20	35.80	2.88	1.92
21		96.30	77.90	47.20	37.80	2.90	1.91
31		114.00	90.70	57.90	46.20	3.50	2.20
42	*	78.40*	68.60*	39.70*	33.20*	2.44*	1.62*
51	*	109.13*	88.37*	60.70*	49.40*	3.55*	2.48*
61	*	87.40*	67.70*	45.30*	33.80*	2.37*	1.32*
71		99.40	76.60	44.60	34.90	2.75	1.88
81		113.00	92.00	55.40	43.40	3.10	2.00
91		99.20	71.20	59.00	47.20	3.10	1.60

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR ZINC, ZN IN DISTILLED WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.13	0.94	0.75	0.56	0.07	0.05
LAB/AN	LAB REJECTED						
11		1.11	0.90	0.72	0.53	0.05	0.04
21		1.14	0.95	0.77	0.56	0.07	0.06
32		1.07	0.96	0.71	0.53	0.06	0.05
41		1.23	0.95	0.73	0.55	0.09	0.07
51		1.08	0.91	0.73	0.54	0.06	0.04
61	*	0.98*	0.82*	0.61*	0.49*	0.05*	0.03*
71		1.14	0.93	0.74	0.54	0.07	0.05
81		1.11	0.96	0.74	0.57	0.07	0.06
91	*	1.20*	1.00*	0.80*	0.60*	0.10*	0.04*

RAW DATA FOR ZINC, ZN IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.13	0.94	0.75	0.56	0.07	0.05
LAB/AN	LAB REJECTED						
11		1.09	0.90	0.73	0.53	0.09	0.05
21		1.13	0.95	0.76	0.56	0.06	0.04
32		1.05	0.88	0.70	0.52	0.07	0.04
41		1.13	0.90	0.67	0.49	0.06	0.04
51		1.12	0.92	0.74	0.56	0.08	0.06
61		0.96	0.81*	0.72	0.60	0.07	0.05
71		1.09	0.92	0.76	0.54	0.07	0.05
81		1.14	0.91	0.73	0.56	0.07	0.05
91		1.20	1.10*	0.80	0.70*	0.05	0.03

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR ZINC, ZN IN DISTILLED WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.13	0.94	0.75	0.56	0.07	0.05
LAB/AN	LAB REJECTED						
11		1.08	0.89	0.71	0.53	0.09	0.04
21		1.13	0.93	0.73	0.54	0.04	0.04
32		1.09	0.93	3.44*	0.54	0.06	0.07
41		1.17	0.93	0.72	0.54	0.06	0.05
51		1.11	0.92	0.71	0.54	0.05	0.01
61	*	0.92*	0.31*	0.61*	0.49*	0.05*	0.04*
71		1.16	0.95	0.76	0.53	0.07	0.06
81		1.10	0.91	0.74	0.56	0.07	0.05
91		1.20	1.00	0.80	0.60*	0.06	0.04

RAW DATA FOR ZINC, ZN IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.13	0.94	0.75	0.56	0.07	0.05
LAB/AN	LAB REJECTED						
11	*	0.95*	0.79*	0.64*	0.46*	0.01*	0.03*
21		1.13	0.98	0.75	0.58	0.06	0.05
32		1.05	0.88	0.69	0.51	0.06	0.05
41		1.13	0.98	0.71	0.55	0.10*	0.08
51		1.13	0.93	0.76	0.56	0.07	0.05
61		0.93*	0.84	0.65	0.47	0.06	0.18*
71		1.14	0.94	0.75	0.53	0.07	0.05
81		1.13	0.93	0.73	0.55	0.07	0.06
91		1.20	0.80	0.60	0.10*	0.06	0.04

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR ZINC, ZN IN DISTILLED WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.13	C.94	0.66	0.47	0.28	0.22
LAB/AN	LAB REJECTED						
11		1.11	C.91	0.64	0.46	0.28	0.22
21		1.13	0.92	0.67	0.46	0.27	0.25
32		1.10	C.91	0.63	0.44	0.27	C.21
41		1.11	C.86	0.63	0.44	0.41*	0.28
51		1.13	0.92	0.65	0.46	0.28	0.22
61	*	0.95*	C.82*	0.54*	0.41*	0.24*	C.20*
71		1.15	0.92	0.61	0.45	0.27	0.21
81		1.12	C.91	0.64	0.47	0.29	C.22
91		1.20*	1.00	0.70	0.50	0.28	C.22

RAW DATA FOR ZINC, ZN IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		1.13	C.94	0.66	0.47	0.28	0.22
LAB/AN	LAB REJECTED						
11		1.11	C.85	0.60*	0.45	0.28	C.23
21		1.14	C.94	0.65	0.47	0.27	0.23
32		1.10	C.90	0.64	0.46	0.27	C.22
41		1.10	C.93	0.64	0.46	0.27	0.26
51		1.12	0.95	0.66	0.48	0.29	0.24
61	*	0.93*	C.79*	0.59*	0.42*	0.26*	C.20*
71		1.09	0.97	0.64	0.45	0.27	0.20
81		1.13	C.96	0.64	0.45	0.29	C.22
91	*	1.40*	1.20*	0.90*	0.70*	0.30*	C.22*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR SILVER, AG IN DISTILLED WATER 4

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		4.13	3.38	1.88	1.50	0.11	0.09
LAB/AN	LAB REJECTED						
11		1.33	2.40	1.10	0.04	0.12	0.10
21		2.56	2.50	1.83	1.48	0.09	0.07
31		1.15	1.08	0.72	1.09	0.10	0.15
42		0.46	0.67	0.42	0.53	0.09	0.08
51		2.39	2.31	1.88	1.51	0.07	0.06
61		2.08	2.06	1.63	1.22	0.08	0.06
71		1.87	1.96	1.85	1.29	0.12	0.09
81		1.97	1.86	1.97	1.42	0.12	0.09
91		1.80	1.40	1.40	0.50	0.10	0.10

RAW DATA FOR SILVER, AG IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		4.13	3.38	1.88	1.50	0.11	0.09
LAB/AN	LAB REJECTED						
11		0.31	2.91	0.50	1.82	0.17	0.08
21		2.62	2.30	1.44	1.13	0.07	0.04
31		1.15	1.04	0.79	0.82	0.10	0.03
42		0.75	0.48	0.52	0.38	0.07	0.06
51		2.44	2.39	1.47	1.09	- 0.01*	- 0.01*
61		1.67	1.91	1.32	0.92	0.05	0.05
71		2.62	2.02	1.70	1.41	0.11	0.09
81		3.27	2.29	1.42	1.10	0.08	0.13
91		2.40	2.40	1.40	1.00	0.10	0.10

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR SILVER, AG IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		4.13	3.38	1.38	1.50	0.11	0.09
LAB/AN	LAB REJECTED						
11		2.05	1.52	1.17	1.40	0.14	0.44*
21		2.20	2.90	1.65	1.35	0.08	0.07
31		0.98	1.00	0.78	0.16*	0.10	0.09
42	*	1.00*	0.67*	0.63*	1.00*	0.09*	0.07*
51		2.44	2.31	1.78	1.41	0.20*	0.09
61		2.03	2.20	1.58	1.18*	0.09	0.07
71		2.72	2.39	1.78	1.43	0.11	0.09
81		3.38	2.18	1.83	1.43	0.10	0.08
91		1.00	1.40	1.50	1.40	0.10	0.10

RAW DATA FOR SILVER, AG IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		4.13	3.38	1.88	1.50	0.11	0.09
LAB/AN	LAB REJECTED						
11		2.39	2.70	1.75	1.42	0.10	0.07
21		2.56	2.70	1.76	1.43	0.09	0.06
31		1.03	1.02	0.86	0.72*	0.11	0.08
42		1.17	0.87	0.79	1.38	0.07	0.08
51		2.79	2.12	1.84	1.50	0.23*	0.17*
61		2.08	1.82	1.62	1.20*	0.07	0.06
71		2.35	1.75	1.78	1.45	0.15	0.11
81		3.80	3.22	1.96	1.55	0.10	0.08
91		*	1.80	1.90	1.50	0.10	0.10

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR THALLIUM, TL IN DISTILLED WATER 4

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		20.70	16.90	11.30	9.39	1.13	0.94
LAB/AN	LAB REJECTED						
11		20.70	16.90	11.50	9.43	1.14	0.97
21	*	22.60*	18.40*	12.30*	10.20*	1.30*	1.11*
32		19.80	16.30	11.00	9.18	1.11	0.95
41	*	17.90*	13.80*	9.66*	7.76*	0.80*	0.80*
51		21.10	17.77	11.02	9.32	1.12	0.93
61		18.50	15.10	10.40	7.88	0.96	0.93
71		19.60	15.80	10.70	8.94	1.11	0.93
81		18.90	15.60	10.50	8.59	0.78	0.75
91		16.76	16.92	13.90*	8.00	1.27	1.17

RAW DATA FOR THALLIUM, TL IN BACKGROUND WATER 1

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		20.70	16.90	11.30	9.39	1.13	0.94
LAB/AN	LAB REJECTED						
11		21.00	16.90	11.40	9.42	1.19	0.99
21	*	23.00*	19.00*	12.50*	10.40*	1.26*	1.08*
32		20.90	17.00	11.50	9.50	1.21	1.02
41	*	19.30*	14.70*	9.90*	8.47*	1.15*	0.94*
51		23.03	18.96	11.53	9.68	1.24	1.02
61		22.10	18.10	10.00	8.10	1.14	1.01
71		20.30	16.50	11.00	9.24	1.23	0.83
81		20.20	16.90	11.20	9.13	1.31	0.85
91		18.06	15.68	9.90	8.95	1.54*	1.07

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

RAW DATA FOR THALLIUM, TL IN BACKGROUND WATER 2

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		20.70	16.90	11.30	9.39	1.13	0.94
LAB/AN	LAB REJECTED						
11		21.40	17.20	11.40	9.52	1.21	1.03
21	*	23.00*	18.80*	12.40*	10.30*	1.30*	1.11*
32		20.60	16.90	11.20	9.41	1.15	0.91
41		17.80	14.70	9.24	8.33	1.01	1.09
51		22.67	18.53	11.53	9.75	1.22	0.98
61	*	19.10*	14.60*	10.10*	7.76*	1.04*	0.91*
71		20.60	17.10	11.30	9.43	1.20	0.93
81		19.90	15.70	10.50	8.95	1.14	0.96
91		17.04	14.02	9.48	9.68	1.43	1.01

RAW DATA FOR THALLIUM, TL IN BACKGROUND WATER 3

		AMPUL 1	AMPUL 2	AMPUL 3	AMPUL 4	AMPUL 5	AMPUL 6
INCREMENT IN MG/L		20.70	16.90	11.30	9.39	1.13	0.94
LAB/AN	LAB REJECTED						
11		20.80	16.70	11.40	9.54	1.16	1.02
21		23.20	18.60	12.20*	10.10	1.23	1.08
32		21.00	17.10	11.20	9.40	1.14	0.94
41		20.00	16.10	11.40	8.82	1.01	1.29
51		22.80	18.54	11.35	9.64	1.19	0.99
61	*	19.30*	14.90*	10.40*	8.31*	1.01*	0.80*
71		19.60	16.20	10.90	9.32	1.13	0.85
81		20.40	16.30	11.20	9.29	1.15	1.17
91	*	23.61*	19.60*	13.30*	10.36*	1.45*	1.25*

* = REJECTED
CT = CONCENTRATION, DM = DIFFERENT METHOD, IM = IMPROPER METHOD, UD = UNACCEPTABLE DATA, < = LESS THAN

CURRENT SIGNIFICANCE LEVELS: 1. LAB RANKING DATA REJECTION TESTS, ALPHA =0.05
2. INDIVIDUAL OUTLIER TESTS USING THOMPSON(S) RULE, ALPHA =0.05

APPENDIX C

SUMMARY STATISTICS

STATISTICAL SUMMARY FOR ALUMINUM, AL ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	6.00	5.00	6.00	5.00
MEAN RECOVERY (X)	5.55	4.55	5.71	4.73
ACCURACY(%REL ERROR)	-7.42	-9.03	-4.84	-5.35
OVERALL STD DEV (S)	0.30	0.26	0.28	0.32
OVERALL REL STD DEV, %	5.37	5.70	4.90	6.75
SINGLE STD DEV, (SR)	0.09		0.18	
ANALYST REL DEV, %	1.81		3.46	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	25.00	20.00	25.00	20.00
MEAN RECOVERY (X)	22.53	18.47	23.89	18.77
ACCURACY(%REL ERROR)	-9.87	-7.67	-4.44	-6.16
OVERALL STD DEV (S)	1.93	1.28	1.40	1.03
OVERALL REL STD DEV, %	8.59	6.92	5.88	5.46
SINGLE STD DEV, (SR)	1.36		0.93	
ANALYST REL DEV, %	6.62		4.37	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	50.00	40.00	50.00	40.00
MEAN RECOVERY (X)	44.98	35.50	45.42	35.97
ACCURACY(%REL ERROR)	-10.23	-11.25	-9.16	-10.07
OVERALL STD DEV (S)	3.55	2.64	3.15	2.94
OVERALL REL STD DEV, %	7.92	7.44	6.93	8.17
SINGLE STD DEV, (SR)	1.40		0.80	
ANALYST REL DEV, %	3.49		1.97	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR ALUMINUM, AL ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	6.00	5.00	6.00	5.00
MEAN RECOVERY (X)	5.63	4.68	5.45	4.58
ACCURACY(%REL ERROR)	-6.23	-6.40	-9.10	-8.47
OVERALL STD DEV (S)	0.30	0.30	0.43	0.45
OVERALL REL STD DEV, %	5.25	6.38	7.81	9.91
SINGLE STD DEV, (SR)	0.16		0.06	
ANALYST REL DEV, %	3.02		1.16	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	25.00	20.00	25.00	20.00
MEAN RECOVERY (X)	23.39	18.13	22.97	18.33
ACCURACY(%REL ERROR)	-6.43	-9.34	-8.10	-8.33
OVERALL STD DEV (S)	1.77	1.82	1.48	1.62
OVERALL REL STD DEV, %	7.58	10.05	6.45	8.83
SINGLE STD DEV, (SR)	0.72		0.59	
ANALYST REL DEV, %	3.45		2.88	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	50.00	40.00	50.00	40.00
MEAN RECOVERY (X)	48.84	39.05	46.74	38.71
ACCURACY(%REL ERROR)	-2.33	-2.38	-6.53	-3.21
OVERALL STD DEV (S)	3.29	1.79	4.94	3.28
OVERALL REL STD DEV, %	6.74	4.60	10.57	8.47
SINGLE STD DEV, (SR)	1.17		1.68	
ANALYST REL DEV, %	2.67		3.93	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR ALUMINUM, AL ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	6.00	5.00	6.00	5.00
MEAN RECOVERY (X)	5.67	4.77	5.79	4.71
ACCURACY(%REL ERROR)	-5.43	-4.55	-3.42	-5.86
OVERALL STD DEV (S)	0.51	0.47	0.31	0.31
OVERALL REL STD DEV, %	9.01	9.85	5.30	6.50
SINGLE STD DEV, (SR)	0.27		0.25	
ANALYST REL DEV, %	5.26		4.75	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	25.00	20.00	25.00	20.00
MEAN RECOVERY (X)	24.34	19.35	24.69	19.52
ACCURACY(%REL ERROR)	-2.64	-3.23	-1.26	-2.39
OVERALL STD DEV (S)	2.98	1.85	2.15	1.52
OVERALL REL STD DEV, %	12.24	9.54	8.70	7.78
SINGLE STD DEV, (SR)	0.95		0.93	
ANALYST REL DEV, %	4.34		4.19	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	50.00	40.00	50.00	40.00
MEAN RECOVERY (X)	50.73	40.93	50.22	39.45
ACCURACY(%REL ERROR)	1.47	2.33	0.43	-1.38
OVERALL STD DEV (S)	4.35	2.66	4.72	3.48
OVERALL REL STD DEV, %	8.57	6.49	9.39	8.82
SINGLE STD DEV, (SR)	2.31		0.98	
ANALYST REL DEV, %	5.04		2.18	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR BARIUM, BA ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	1.40	1.05	1.40	1.05
MEAN RECOVERY (X)	1.31	1.01	1.41	1.09
ACCURACY(%REL ERROR)	-6.26	-3.75	0.80	4.04
OVERALL STD DEV (S)	0.05	0.09	0.14	0.26
OVERALL REL STD DEV, %	3.87	8.79	9.91	23.62
SINGLE STD DEV, (SR)	0.08		0.12	
ANALYST REL DEV, %	6.92		9.31	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	6.99	5.25	6.99	5.25
MEAN RECOVERY (X)	6.70	5.14	5.30	4.26
ACCURACY(%REL ERROR)	-4.08	-2.13	-24.19	-18.84
OVERALL STD DEV (S)	0.59	0.30	0.75	0.54
OVERALL REL STD DEV, %	8.77	5.76	14.15	12.56
SINGLE STD DEV, (SR)	0.35		0.52	
ANALYST REL DEV, %	5.92		10.87	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	20.90	17.50	20.90	17.50
MEAN RECOVERY (X)	20.49	16.59	13.95	11.35
ACCURACY(%REL ERROR)	-1.96	-5.21	-33.27	-35.16
OVERALL STD DEV (S)	3.17	2.53	2.79	2.54
OVERALL REL STD DEV, %	15.48	15.27	20.00	22.34
SINGLE STD DEV, (SR)	0.88		0.88	
ANALYST REL DEV, %	4.74		6.98	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR BARIUM, BA ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	6	6
TRUE CONC (C) MG/L	1.40	1.05	1.40	1.05
MEAN RECOVERY (X)	1.22	0.93	1.25	0.95
ACCURACY(%REL ERROR)	-12.86	-11.74	-10.63	-9.44
OVERALL STD DEV (S)	0.16	0.13	0.10	0.08
OVERALL REL STD DEV, %	12.78	14.44	7.67	8.43
SINGLE STD DEV, (SR)	0.05		0.04	
ANALYST REL DEV, %	5.07		3.89	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	6.99	5.24	6.99	5.24
MEAN RECOVERY (X)	6.33	4.73	6.50	4.72
ACCURACY(%REL ERROR)	-9.49	-9.64	-6.98	-9.87
OVERALL STD DEV (S)	0.50	0.34	0.39	0.29
OVERALL REL STD DEV, %	7.89	7.25	5.96	6.18
SINGLE STD DEV, (SR)	0.26		0.26	
ANALYST REL DEV, %	4.74		4.62	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	21.00	17.50	21.00	17.50
MEAN RECOVERY (X)	19.14	16.31	19.51	16.58
ACCURACY(%REL ERROR)	-8.85	-3.97	-7.12	-5.25
OVERALL STD DEV (S)	1.93	1.17	1.44	1.02
OVERALL REL STD DEV, %	10.06	6.99	7.40	6.16
SINGLE STD DEV, (SR)	1.55		0.75	
ANALYST REL DEV, %	8.61		4.16	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR BARIUM, BA ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	9	9
TRUE CONC (C) MG/L	1.40	1.05	1.40	1.05
MEAN RECOVERY (X)	1.43	0.99	1.37	0.88
ACCURACY(%REL ERROR)	2.33	-5.65	-2.02	-16.02
OVERALL STD DEV (S)	0.14	0.08	0.32	0.26
OVERALL REL STD DEV, %	10.00	8.09	23.13	29.46
SINGLE STD DEV, (SR)	0.13		0.11	
ANALYST REL DEV, %	10.54		9.84	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	9	9
TRUE CONC (C) MG/L	6.99	5.24	6.99	5.24
MEAN RECOVERY (X)	7.16	5.36	4.43	4.17
ACCURACY(%REL ERROR)	2.48	2.22	-36.57	-20.42
OVERALL STD DEV (S)	1.02	0.76	1.05	0.86
OVERALL REL STD DEV, %	14.22	14.21	23.75	20.65
SINGLE STD DEV, (SR)	0.32		0.26	
ANALYST REL DEV, %	5.09		5.98	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	9	8
TRUE CONC (C) MG/L	21.00	17.50	21.00	17.50
MEAN RECOVERY (X)	23.10	19.13	8.36	6.73
ACCURACY(%REL ERROR)	9.98	9.29	-60.17	-61.56
OVERALL STD DEV (S)	2.32	1.64	2.29	1.26
OVERALL REL STD DEV, %	10.03	8.59	27.37	18.70
SINGLE STD DEV, (SR)	0.76		1.50	
ANALYST REL DEV, %	3.61		19.89	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR BERYLLIUM, BE ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	7	8	8
TRUE CONC (C) MG/L	0.06	0.04	0.06	0.04
MEAN RECOVERY (X)	0.06	0.04	0.06	0.04
ACCURACY(%REL ERROR)	-6.46	-3.57	-1.67	6.56
OVERALL STD DEV (S)	0.01	0.00	0.01	0.00
OVERALL REL STD DEV, %	13.31	4.93	12.68	10.86
SINGLE STD DEV, (SR)	0.00		0.01	
ANALYST REL DEV, %	6.10		10.06	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	9	9	7	8
TRUE CONC (C) MG/L	0.80	0.60	0.80	0.60
MEAN RECOVERY (X)	0.75	0.58	0.79	0.58
ACCURACY(%REL ERROR)	-5.69	-4.15	-0.66	-3.31
OVERALL STD DEV (S)	0.05	0.03	0.03	0.03
OVERALL REL STD DEV, %	6.13	5.08	3.30	5.95
SINGLE STD DEV, (SR)	0.02		0.03	
ANALYST REL DEV, %	3.41		3.77	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	9	9	8	8
TRUE CONC (C) MG/L	2.00	1.60	2.00	1.60
MEAN RECOVERY (X)	1.93	1.54	1.90	1.54
ACCURACY(%REL ERROR)	-3.36	-4.02	-5.04	-4.05
OVERALL STD DEV (S)	0.16	0.09	0.09	0.08
OVERALL REL STD DEV, %	8.10	5.60	4.64	4.92
SINGLE STD DEV, (SR)	0.08		0.02	
ANALYST REL DEV, %	4.40		1.02	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR BERYLLIUM, BE ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	0.06	0.04	0.06	0.04
MEAN RECOVERY (X)	0.05	0.03	0.06	0.04
ACCURACY(%REL ERROR)	-8.75	-18.44	2.62	-0.00
OVERALL STD DEV (S)	0.01	0.01	0.00	0.00
OVERALL REL STD DEV, %	11.75	26.67	6.28	6.77
SINGLE STD DEV, (SR)	0.00		0.00	
ANALYST REL DEV, %	11.20		6.01	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	6	7
TRUE CONC (C) MG/L	0.80	0.60	0.80	0.60
MEAN RECOVERY (X)	0.77	0.58	0.78	0.58
ACCURACY(%REL ERROR)	-3.92	-3.88	-2.83	-3.57
OVERALL STD DEV (S)	0.03	0.02	0.01	0.01
OVERALL REL STD DEV, %	4.23	3.65	1.84	2.49
SINGLE STD DEV, (SR)	0.02		0.01	
ANALYST REL DEV, %	2.47		1.11	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	2.00	1.60	2.00	1.60
MEAN RECOVERY (X)	1.90	1.54	1.90	1.53
ACCURACY(%REL ERROR)	-5.07	-3.78	-4.89	-4.12
OVERALL STD DEV (S)	0.06	0.06	0.09	0.06
OVERALL REL STD DEV, %	3.24	3.89	4.52	4.09
SINGLE STD DEV, (SR)	0.02		0.02	
ANALYST REL DEV, %	1.06		1.18	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR BERYLLIUM, BE ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	0.06	0.04	0.06	0.04
MEAN RECOVERY (X)	0.06	0.04	0.06	0.04
ACCURACY(%REL ERROR)	-1.67	-5.00	-2.08	-4.38
OVERALL STD DEV (S)	0.01	0.01	0.01	0.01
OVERALL REL STD DEV, %	18.25	18.30	9.91	18.34
SINGLE ANALYST STD DEV, (SR)	0.01		0.00	
SINGLE ANALYST REL DEV, %	11.23		8.82	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	0.80	0.60	0.80	0.60
MEAN RECOVERY (X)	0.78	0.59	0.76	0.58
ACCURACY(%REL ERROR)	-2.57	-2.12	-2.39	-2.60
OVERALL STD DEV (S)	0.04	0.03	0.03	0.03
OVERALL REL STD DEV, %	4.63	4.93	4.23	4.29
SINGLE ANALYST STD DEV, (SR)	0.01		0.01	
SINGLE ANALYST REL DEV, %	2.08		1.52	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	2.00	1.60	2.00	1.60
MEAN RECOVERY (X)	1.99	1.58	1.98	1.58
ACCURACY(%REL ERROR)	-0.62	-1.11	-1.09	-0.98
OVERALL STD DEV (S)	0.05	0.04	0.10	0.07
OVERALL REL STD DEV, %	2.47	2.34	4.84	4.41
SINGLE ANALYST STD DEV, (SR)	0.02		0.03	
SINGLE ANALYST REL DEV, %	1.34		1.95	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR CALCIUM, CA ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	5	5
TRUE CONC (C) MG/L	105.00	90.00	105.00	90.00
MEAN RECOVERY (X)	109.36	91.92	101.22	88.74
ACCURACY(%REL ERROR)	4.15	2.14	-3.60	-1.40
OVERALL STD DEV (S)	10.76	8.39	13.74	8.13
OVERALL REL STD DEV, %	9.84	9.13	13.57	9.16
SINGLE STD DEV, (SR)	4.06		6.63	
ANALYST REL DEV, %	4.03		6.98	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	5	6
TRUE CONC (C) MG/L	195.00	150.00	195.00	150.00
MEAN RECOVERY (X)	189.89	148.12	188.27	162.32
ACCURACY(%REL ERROR)	-2.62	-1.25	-3.45	8.55
OVERALL STD DEV (S)	17.60	11.63	13.27	32.53
OVERALL REL STD DEV, %	9.27	7.85	7.05	19.98
SINGLE STD DEV, (SR)	5.91		2.51	
ANALYST REL DEV, %	3.50		1.43	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	6	6
TRUE CONC (C) MG/L	300.00	270.00	300.00	270.00
MEAN RECOVERY (X)	279.94	257.35	295.65	265.90
ACCURACY(%REL ERROR)	-6.69	-4.69	-1.45	-1.52
OVERALL STD DEV (S)	33.50	25.00	45.30	43.68
OVERALL REL STD DEV, %	11.97	9.72	15.32	16.43
SINGLE STD DEV, (SR)	7.42		9.46	
ANALYST REL DEV, %	2.76		3.37	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR CALCIUM, CA ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	6	6
TRUE CONC (C) MG/L	27.00	24.00	27.00	24.00
MEAN RECOVERY (X)	26.04	23.63	27.89	25.33
ACCURACY(%REL ERROR)	-3.57	-1.53	3.31	5.53
OVERALL STD DEV (S)	1.63	1.73	3.27	3.45
OVERALL REL STD DEV, %	6.24	7.32	11.72	13.64
SINGLE STD DEV, (SR)	0.40		0.67	
ANALYST REL DEV, %	1.62		2.52	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	6	6
TRUE CONC (C) MG/L	36.00	30.00	36.00	30.00
MEAN RECOVERY (X)	34.53	27.78	37.43	29.15
ACCURACY(%REL ERROR)	-4.07	-7.39	3.98	-2.84
OVERALL STD DEV (S)	4.80	2.53	3.24	2.54
OVERALL REL STD DEV, %	13.90	9.11	8.64	8.73
SINGLE STD DEV, (SR)	2.48		1.23	
ANALYST REL DEV, %	7.96		3.69	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	6	6
TRUE CONC (C) MG/L	75.00	60.00	75.00	60.00
MEAN RECOVERY (X)	73.09	56.58	69.84	66.70
ACCURACY(%REL ERROR)	-2.55	-5.69	-6.88	11.17
OVERALL STD DEV (S)	7.62	7.65	4.67	5.63
OVERALL REL STD DEV, %	10.43	13.51	6.68	8.74
SINGLE STD DEV, (SR)	7.74		1.86	
ANALYST REL DEV, %	11.94		2.73	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR CALCIUM, CA ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	6	6	6
TRUE CONC (C) MG/L	9.00	6.00	9.00	6.00
MEAN RECOVERY (X)	8.42	5.77	6.81	4.64
ACCURACY(%REL ERROR)	-6.39	-3.78	-24.29	-22.72
OVERALL STD DEV (S)	0.53	0.33	2.06	1.85
OVERALL REL STD DEV, %	6.25	5.72	30.23	39.79
SINGLE STD DEV, (SR)	0.16		0.44	
ANALYST REL DEV, %	2.23		7.73	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	6	6
TRUE CONC (C) MG/L	15.00	12.00	15.00	12.00
MEAN RECOVERY (X)	13.12	10.65	12.00	8.71
ACCURACY(%REL ERROR)	-12.53	-11.25	-19.97	-27.38
OVERALL STD DEV (S)	2.27	1.43	3.69	3.36
OVERALL REL STD DEV, %	17.30	13.40	30.77	38.51
SINGLE STD DEV, (SR)	0.71		1.01	
ANALYST REL DEV, %	6.01		9.78	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	6	6
TRUE CONC (C) MG/L	27.00	24.00	27.00	24.00
MEAN RECOVERY (X)	25.39	21.31	23.06	21.22
ACCURACY(%REL ERROR)	-5.98	-11.19	-14.60	-11.59
OVERALL STD DEV (S)	6.47	4.35	9.09	8.31
OVERALL REL STD DEV, %	25.47	20.40	39.44	39.18
SINGLE STD DEV, (SR)	2.57		0.94	
ANALYST REL DEV, %	11.01		4.24	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR CADMIUM, CD ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	0.06	0.04	0.06	0.04
MEAN RECOVERY (X)	0.07	0.03	0.06	0.04
ACCURACY(%REL ERROR)	18.53	-5.74	3.57	8.11
OVERALL STD DEV (S)	0.02	0.02	0.01	0.01
OVERALL REL STD DEV, %	24.47	43.23	17.44	36.31
SINGLE STD DEV, (SR)	0.02		0.01	
ANALYST REL DEV, %	37.24		10.83	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	0.75	0.56	0.75	0.56
MEAN RECOVERY (X)	0.74	0.56	0.75	0.55
ACCURACY(%REL ERROR)	-0.78	0.20	-0.36	-1.38
OVERALL STD DEV (S)	0.04	0.03	0.03	0.03
OVERALL REL STD DEV, %	5.52	4.81	4.60	4.78
SINGLE STD DEV, (SR)	0.01		0.02	
ANALYST REL DEV, %	2.09		2.47	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	1.86	1.49	1.86	1.49
MEAN RECOVERY (X)	1.85	1.48	1.85	1.46
ACCURACY(%REL ERROR)	-0.73	-0.57	-0.42	-1.79
OVERALL STD DEV (S)	0.05	0.05	0.07	0.07
OVERALL REL STD DEV, %	2.67	3.68	3.58	4.83
SINGLE STD DEV, (SR)	0.02		0.04	
ANALYST REL DEV, %	1.29		2.26	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR CADMIUM, CD ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	7	7	8
TRUE CONC (C) MG/L	0.06	0.04	0.06	0.04
MEAN RECOVERY (X)	0.06	0.04	0.06	0.03
ACCURACY(%REL ERROR)	1.49	-2.70	0.77	-6.42
OVERALL STD DEV (S)	0.00	0.01	0.00	0.02
OVERALL REL STD DEV, %	4.64	40.09	8.24	46.85
SINGLE STD DEV, (SR)	0.01		0.01	
ANALYST REL DEV, %	12.21		12.26	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	0.75	0.56	0.75	0.56
MEAN RECOVERY (X)	0.75	0.55	0.75	0.56
ACCURACY(%REL ERROR)	0.25	-1.20	0.60	-0.87
OVERALL STD DEV (S)	0.03	0.03	0.04	0.03
OVERALL REL STD DEV, %	3.79	5.07	5.44	5.37
SINGLE STD DEV, (SR)	0.01		0.02	
ANALYST REL DEV, %	1.79		2.75	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	1.86	1.49	1.86	1.49
MEAN RECOVERY (X)	1.83	1.48	1.85	1.51
ACCURACY(%REL ERROR)	-1.40	-0.53	-0.42	1.67
OVERALL STD DEV (S)	0.05	0.07	0.11	0.09
OVERALL REL STD DEV, %	2.97	4.67	5.78	5.68
SINGLE STD DEV, (SR)	0.03		0.03	
ANALYST REL DEV, %	1.94		1.53	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR CADMIUM, CD ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	6	5	5
TRUE CONC (C) MG/L	0.06	0.04	0.06	0.04
MEAN RECOVERY (X)	0.06	0.04	0.05	0.04
ACCURACY(%REL ERROR)	-0.51	-1.80	-7.86	-2.16
OVERALL STD DEV (S)	0.00	0.00	0.01	0.00
OVERALL REL STD DEV, %	7.59	9.48	10.03	7.67
SINGLE STD DEV, (SR)	0.00		0.00	
ANALYST REL DEV, %	7.59		8.26	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	6	6
TRUE CONC (C) MG/L	0.75	0.56	0.75	0.56
MEAN RECOVERY (X)	0.74	0.55	0.73	0.55
ACCURACY(%REL ERROR)	-1.28	-1.25	-2.89	-1.88
OVERALL STD DEV (S)	0.03	0.02	0.04	0.03
OVERALL REL STD DEV, %	4.64	3.83	5.49	5.70
SINGLE STD DEV, (SR)	0.01		0.01	
ANALYST REL DEV, %	1.79		1.36	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	6	6
TRUE CONC (C) MG/L	1.86	1.49	1.86	1.49
MEAN RECOVERY (X)	1.85	1.48	1.84	1.46
ACCURACY(%REL ERROR)	-0.68	-0.75	-1.08	-2.01
OVERALL STD DEV (S)	0.06	0.06	0.06	0.09
OVERALL REL STD DEV, %	3.33	4.22	3.37	6.00
SINGLE STD DEV, (SR)	0.03		0.03	
ANALYST REL DEV, %	1.65		1.65	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR COBALT, CO ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	6	5
TRUE CONC (C) MG/L	1.20	0.96	1.20	0.96
MEAN RECOVERY (X)	1.21	0.97	1.24	0.98
ACCURACY(%REL ERROR)	0.61	1.50	3.44	1.58
OVERALL STD DEV (S)	0.04	0.04	0.07	0.02
OVERALL REL STD DEV, %	3.03	4.56	5.65	2.14
SINGLE STD DEV, (SR)	0.04		0.07	
ANALYST REL DEV, %	3.85		5.93	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	6	6
TRUE CONC (C) MG/L	3.50	2.40	3.50	2.40
MEAN RECOVERY (X)	3.64	2.43	3.77	2.61
ACCURACY(%REL ERROR)	3.96	1.19	7.82	8.66
OVERALL STD DEV (S)	0.14	0.10	0.16	0.17
OVERALL REL STD DEV, %	3.94	4.03	4.11	6.67
SINGLE STD DEV, (SR)	0.04		0.11	
ANALYST REL DEV, %	1.25		3.42	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	6	6	6
TRUE CONC (C) MG/L	6.00	4.80	6.00	4.80
MEAN RECOVERY (X)	6.04	4.84	6.37	5.06
ACCURACY(%REL ERROR)	0.61	0.89	6.13	5.47
OVERALL STD DEV (S)	0.09	0.09	0.37	0.27
OVERALL REL STD DEV, %	1.55	1.79	5.78	5.26
SINGLE STD DEV, (SR)	0.07		0.13	
ANALYST REL DEV, %	1.21		2.21	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR COBALT, CO ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	6	5	5
TRUE CONC (C) MG/L	0.60	0.36	0.60	0.36
MEAN RECOVERY (X)	0.62	0.36	0.61	0.37
ACCURACY(%REL ERROR)	2.78	0.09	2.33	1.67
OVERALL STD DEV (S)	0.03	0.01	0.02	0.01
OVERALL REL STD DEV, %	4.06	2.37	3.75	3.11
SINGLE STD DEV, (SR)	0.02		0.02	
ANALYST REL DEV, %	4.51		3.45	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	6	6
TRUE CONC (C) MG/L	3.00	2.40	3.00	2.40
MEAN RECOVERY (X)	3.05	2.45	2.99	2.33
ACCURACY(%REL ERROR)	1.57	2.02	-0.44	-2.85
OVERALL STD DEV (S)	0.16	0.09	0.09	0.10
OVERALL REL STD DEV, %	5.31	3.83	3.07	4.12
SINGLE STD DEV, (SR)	0.07		0.01	
ANALYST REL DEV, %	2.68		0.47	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	6	6
TRUE CONC (C) MG/L	6.00	4.80	6.00	4.80
MEAN RECOVERY (X)	6.05	4.88	5.97	4.86
ACCURACY(%REL ERROR)	0.76	1.58	-2.14	1.22
OVERALL STD DEV (S)	0.30	0.27	0.30	0.24
OVERALL REL STD DEV, %	4.92	5.62	5.13	5.04
SINGLE STD DEV, (SR)	0.13		0.12	
ANALYST REL DEV, %	2.45		2.25	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR COBALT, CO ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	18.00	12.00	18.00	12.00
MEAN RECOVERY (X)	18.60	12.48	20.42	13.55
ACCURACY(%REL ERROR)	3.32	3.98	13.45	12.89
OVERALL STD DEV (S)	1.36	0.72	0.50	1.12
OVERALL REL STD DEV, %	7.33	5.79	2.47	8.28
SINGLE STD DEV, (SR)	0.58		0.76	
ANALYST REL DEV, %	3.71		4.47	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	30.00	24.00	30.00	24.00
MEAN RECOVERY (X)	30.61	24.37	33.69	27.04
ACCURACY(%REL ERROR)	2.03	1.55	12.31	12.66
OVERALL STD DEV (S)	2.28	1.27	2.22	0.78
OVERALL REL STD DEV, %	7.44	5.22	6.60	2.87
SINGLE STD DEV, (SR)	0.84		1.05	
ANALYST REL DEV, %	3.04		3.46	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	6	6	7	6
TRUE CONC (C) MG/L	60.00	48.00	60.00	48.00
MEAN RECOVERY (X)	63.13	50.28	63.63	51.06
ACCURACY(%REL ERROR)	5.22	4.76	6.04	6.37
OVERALL STD DEV (S)	3.69	2.26	5.35	2.60
OVERALL REL STD DEV, %	5.84	4.50	8.41	5.10
SINGLE STD DEV, (SR)	1.62		2.18	
ANALYST REL DEV, %	2.85		3.79	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR CHROMIUM, CR ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	0.61	0.44	0.61	0.44
MEAN RECOVERY (X)	0.67	0.47	0.62	0.46
ACCURACY(%REL ERROR)	10.49	7.92	1.52	4.61
OVERALL STD DEV (S)	0.09	0.05	0.06	0.05
OVERALL REL STD DEV, %	13.11	10.34	9.07	11.02
SINGLE STD DEV, (SR)	0.04		0.03	
ANALYST REL DEV, %	6.47		5.34	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	7.00	4.33	7.00	4.33
MEAN RECOVERY (X)	7.37	4.67	7.43	4.51
ACCURACY(%REL ERROR)	5.24	7.92	6.09	4.07
OVERALL STD DEV (S)	0.57	0.32	0.84	0.50
OVERALL REL STD DEV, %	7.71	6.86	11.29	11.14
SINGLE STD DEV, (SR)	0.21		0.34	
ANALYST REL DEV, %	3.50		5.78	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	6
TRUE CONC (C) MG/L	10.50	8.75	10.50	8.75
MEAN RECOVERY (X)	11.16	9.29	11.24	9.56
ACCURACY(%REL ERROR)	6.30	6.20	7.04	9.25
OVERALL STD DEV (S)	1.21	0.85	1.41	0.36
OVERALL REL STD DEV, %	10.83	9.19	12.53	3.80
SINGLE STD DEV, (SR)	0.29		0.35	
ANALYST REL DEV, %	2.83		3.32	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR CHROMIUM, CR ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	6	6	7
TRUE CONC (C) MG/L	0.61	0.44	0.61	0.44
MEAN RECOVERY (X)	0.64	0.45	0.66	0.47
ACCURACY(%REL ERROR)	4.37	3.41	8.74	6.49
OVERALL STD DEV (S)	0.04	0.04	0.04	0.05
OVERALL REL STD DEV, %	5.93	8.76	6.37	10.19
SINGLE STD DEV, (SR)	0.01		0.03	
ANALYST REL DEV, %	1.91		5.22	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	5	4	7	7
TRUE CONC (C) MG/L	7.00	4.38	7.00	4.38
MEAN RECOVERY (X)	7.34	4.62	7.38	4.48
ACCURACY(%REL ERROR)	4.80	5.59	5.39	2.28
OVERALL STD DEV (S)	0.18	0.02	0.84	0.71
OVERALL REL STD DEV, %	2.48	0.37	11.42	15.82
SINGLE STD DEV, (SR)	0.05		0.19	
ANALYST REL DEV, %	0.83		3.25	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	5	6	7	7
TRUE CONC (C) MG/L	10.50	8.75	10.50	8.75
MEAN RECOVERY (X)	10.98	9.65	11.22	9.45
ACCURACY(%REL ERROR)	4.57	10.34	6.84	7.97
OVERALL STD DEV (S)	0.44	0.97	1.42	1.34
OVERALL REL STD DEV, %	4.04	10.08	12.70	14.17
SINGLE STD DEV, (SR)	0.14		0.27	
ANALYST REL DEV, %	1.38		2.58	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR CHROMIUM, CR ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	17.50	13.10	17.50	13.10
MEAN RECOVERY (X)	19.32	15.16	19.34	14.35
ACCURACY(%REL ERROR)	10.39	15.69	10.50	9.54
OVERALL STD DEV (S)	0.81	1.58	3.11	2.13
OVERALL REL STD DEV, %	4.17	10.40	16.09	14.84
SINGLE STD DEV, (SR)	0.71		1.13	
ANALYST REL DEV, %	4.12		6.73	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	6	8	7
TRUE CONC (C) MG/L	26.30	21.90	26.30	21.90
MEAN RECOVERY (X)	28.38	23.40	29.73	24.54
ACCURACY(%REL ERROR)	7.92	6.85	13.05	12.06
OVERALL STD DEV (S)	1.34	0.60	3.04	2.15
OVERALL REL STD DEV, %	4.74	2.58	10.21	8.78
SINGLE STD DEV, (SR)	0.42		1.28	
ANALYST REL DEV, %	1.63		4.73	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	8
TRUE CONC (C) MG/L	43.80	35.00	43.80	35.00
MEAN RECOVERY (X)	47.74	37.73	47.61	38.58
ACCURACY(%REL ERROR)	9.00	7.80	8.71	10.23
OVERALL STD DEV (S)	2.14	0.75	1.79	1.17
OVERALL REL STD DEV, %	4.48	1.99	3.76	3.03
SINGLE STD DEV, (SR)	1.38		1.70	
ANALYST REL DEV, %	3.24		3.95	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR COPPER, CU ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	5	7	7
TRUE CONC (C) MG/L	0.20	0.15	0.20	0.15
MEAN RECOVERY (X)	0.20	0.16	0.20	0.15
ACCURACY(%REL ERROR)	-0.25	5.33	-0.43	1.90
OVERALL STD DEV (S)	0.01	0.00	0.01	0.01
OVERALL REL STD DEV, %	5.69	1.95	6.80	5.07
SINGLE STD DEV, (SR)	0.01		0.01	
ANALYST REL DEV, %	4.95		3.75	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	2.00	1.50	2.00	1.50
MEAN RECOVERY (X)	1.97	1.46	1.96	1.45
ACCURACY(%REL ERROR)	-1.29	-2.33	-1.98	-3.47
OVERALL STD DEV (S)	0.05	0.04	0.05	0.06
OVERALL REL STD DEV, %	2.54	2.85	2.75	4.08
SINGLE STD DEV, (SR)	0.01		0.05	
ANALYST REL DEV, %	0.76		2.94	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	6	6	6	7
TRUE CONC (C) MG/L	5.00	4.00	5.00	4.00
MEAN RECOVERY (X)	4.98	3.91	4.89	3.87
ACCURACY(%REL ERROR)	-2.30	-2.20	-2.17	-3.16
OVERALL STD DEV (S)	0.12	0.12	0.09	0.10
OVERALL REL STD DEV, %	2.50	2.98	1.75	2.48
SINGLE STD DEV, (SR)	0.03		0.05	
ANALYST REL DEV, %	0.73		1.17	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR COPPER, CU ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	4	6	6	6
TRUE CONC (C) MG/L	0.21	0.15	0.21	0.15
MEAN RECOVERY (X)	0.20	0.15	0.19	0.15
ACCURACY(%REL ERROR)	-4.40	-0.89	-8.25	-1.33
OVERALL STD DEV (S)	0.00	0.01	0.02	0.01
OVERALL REL STD DEV, %	0.48	6.88	9.95	8.59
SINGLE STD DEV, (SR)	0.00		0.01	
ANALYST REL DEV, %	1.16		3.39	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	6	6	6	6
TRUE CONC (C) MG/L	2.00	1.50	2.00	1.50
MEAN RECOVERY (X)	1.95	1.47	1.93	1.46
ACCURACY(%REL ERROR)	-2.66	-2.32	-3.30	-2.43
OVERALL STD DEV (S)	0.05	0.03	0.04	0.03
OVERALL REL STD DEV, %	2.55	2.06	2.24	2.07
SINGLE STD DEV, (SR)	0.02		0.02	
ANALYST REL DEV, %	0.96		0.98	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	6	6	6	6
TRUE CONC (C) MG/L	5.00	4.00	5.00	4.00
MEAN RECOVERY (X)	4.96	3.95	4.85	3.90
ACCURACY(%REL ERROR)	-0.79	-1.16	-3.08	-2.42
OVERALL STD DEV (S)	0.10	0.06	0.16	0.11
OVERALL REL STD DEV, %	2.03	1.54	3.32	2.75
SINGLE STD DEV, (SR)	0.05		0.07	
ANALYST REL DEV, %	1.07		1.70	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR COPPER, CU ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	6	7	6
TRUE CONC (C) MG/L	0.20	0.15	0.20	0.15
MEAN RECOVERY (X)	0.20	0.15	0.21	0.15
ACCURACY(%REL ERROR)	2.25	2.78	3.07	1.11
OVERALL STD DEV (S)	0.01	0.00	0.02	0.01
OVERALL REL STD DEV, %	5.10	3.19	9.00	6.58
SINGLE STD DEV, (SR)	0.01		0.01	
ANALYST REL DEV, %	3.57		4.78	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	2.00	1.50	2.00	1.50
MEAN RECOVERY (X)	1.97	1.47	1.96	1.49
ACCURACY(%REL ERROR)	-1.51	-1.97	-1.75	-0.38
OVERALL STD DEV (S)	0.04	0.04	0.09	0.06
OVERALL REL STD DEV, %	2.16	2.57	4.78	3.97
SINGLE STD DEV, (SR)	0.01		0.03	
ANALYST REL DEV, %	0.75		1.74	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	6	6	7	6
TRUE CONC (C) MG/L	5.00	4.00	5.00	4.00
MEAN RECOVERY (X)	4.97	3.93	5.00	3.97
ACCURACY(%REL ERROR)	-0.69	-1.74	-0.08	-0.77
OVERALL STD DEV (S)	0.10	0.10	0.15	0.15
OVERALL REL STD DEV, %	2.06	2.46	2.94	3.70
SINGLE STD DEV, (SR)	0.02		0.05	
ANALYST REL DEV, %	0.47		1.14	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR IRON, FE ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	3.60	2.70	3.60	2.70
MEAN RECOVERY (X)	3.42	2.53	3.76	2.83
ACCURACY(%REL ERROR)	-5.06	-6.25	4.46	4.69
OVERALL STD DEV (S)	0.15	0.09	0.21	0.09
OVERALL REL STD DEV, %	4.28	3.61	5.49	3.16
SINGLE STD DEV, (SR)	0.10		0.10	
ANALYST REL DEV, %	3.29		3.14	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	6.75	4.50	6.75	4.50
MEAN RECOVERY (X)	6.50	4.33	7.32	4.81
ACCURACY(%REL ERROR)	-3.69	-3.76	8.42	6.85
OVERALL STD DEV (S)	0.38	0.18	0.42	0.25
OVERALL REL STD DEV, %	5.81	4.09	5.80	5.29
SINGLE STD DEV, (SR)	0.33		0.18	
ANALYST REL DEV, %	6.10		3.01	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	11.30	9.00	11.30	9.00
MEAN RECOVERY (X)	10.66	8.57	11.04	8.85
ACCURACY(%REL ERROR)	-5.71	-4.75	-2.34	-1.69
OVERALL STD DEV (S)	0.45	0.49	0.77	0.75
OVERALL REL STD DEV, %	4.22	5.74	6.95	8.49
SINGLE STD DEV, (SR)	0.15		0.33	
ANALYST REL DEV, %	1.60		3.30	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR IRON, FE ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	9.00	6.75	9.00	6.75
MEAN RECOVERY (X)	9.26	7.09	8.68	6.42
ACCURACY(%REL ERROR)	2.90	5.06	-3.53	-4.82
OVERALL STD DEV (S)	0.57	0.50	0.67	0.49
OVERALL REL STD DEV, %	6.20	7.11	7.71	7.60
SINGLE STD DEV, (SR)	0.25		0.31	
ANALYST REL DEV, %	3.01		4.16	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	13.50	11.30	13.50	11.30
MEAN RECOVERY (X)	13.46	11.11	12.83	10.88
ACCURACY(%REL ERROR)	-0.32	-1.68	-4.93	-3.70
OVERALL STD DEV (S)	0.60	0.39	0.87	0.82
OVERALL REL STD DEV, %	4.45	3.52	6.74	7.52
SINGLE STD DEV, (SR)	0.29		0.29	
ANALYST REL DEV, %	2.40		2.42	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	22.50	18.00	22.50	18.00
MEAN RECOVERY (X)	22.29	17.69	20.19	18.78
ACCURACY(%REL ERROR)	-0.95	-1.73	-10.28	4.31
OVERALL STD DEV (S)	1.24	1.12	1.69	2.46
OVERALL REL STD DEV, %	5.54	6.31	8.38	13.09
SINGLE STD DEV, (SR)	0.45		0.83	
ANALYST REL DEV, %	2.27		4.28	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR IRON, FE ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	5	6	6
TRUE CONC (C) MG/L	3.60	2.70	3.60	2.70
MEAN RECOVERY (X)	3.29	2.62	2.99	2.20
ACCURACY(%REL ERROR)	-8.61	-2.94	-16.94	-18.64
OVERALL STD DEV (S)	0.26	0.09	0.35	0.29
OVERALL REL STD DEV, %	7.77	3.05	11.77	13.04
SINGLE STD DEV, (SR)	0.10		0.08	
ANALYST REL DEV, %	3.37		2.94	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	6	6	6	6
TRUE CONC (C) MG/L	6.75	4.50	6.75	4.50
MEAN RECOVERY (X)	6.52	4.12	6.36	4.35
ACCURACY(%REL ERROR)	-3.34	-8.46	-5.75	-3.22
OVERALL STD DEV (S)	0.34	0.27	0.33	0.36
OVERALL REL STD DEV, %	5.27	6.59	5.13	8.24
SINGLE STD DEV, (SR)	0.23		0.11	
ANALYST REL DEV, %	4.25		2.03	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	6	6	6	6
TRUE CONC (C) MG/L	11.30	9.00	11.30	9.00
MEAN RECOVERY (X)	10.53	8.51	10.31	8.06
ACCURACY(%REL ERROR)	-6.79	-5.44	-8.72	-10.48
OVERALL STD DEV (S)	0.61	0.50	0.98	0.40
OVERALL REL STD DEV, %	5.82	5.88	9.48	5.02
SINGLE STD DEV, (SR)	0.10		0.49	
ANALYST REL DEV, %	1.10		5.34	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR POTASSIUM, K ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	9.40	7.00	9.40	7.00
MEAN RECOVERY (X)	9.46	6.86	8.90	7.07
ACCURACY(%REL ERROR)	0.61	-1.94	-5.36	0.99
OVERALL STD DEV (S)	0.59	0.54	0.87	1.10
OVERALL REL STD DEV, %	6.23	7.90	9.83	15.53
SINGLE STD DEV, (SR)	0.24		0.83	
ANALYST REL DEV, %	2.98		10.38	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	18.20	14.80	18.20	14.80
MEAN RECOVERY (X)	18.43	15.07	19.38	15.43
ACCURACY(%REL ERROR)	1.26	1.83	6.48	4.23
OVERALL STD DEV (S)	1.91	1.13	2.18	1.18
OVERALL REL STD DEV, %	10.37	7.52	11.26	7.66
SINGLE STD DEV, (SR)	0.62		1.81	
ANALYST REL DEV, %	3.71		10.38	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	34.50	27.60	34.50	27.60
MEAN RECOVERY (X)	36.14	28.96	34.99	31.01
ACCURACY(%REL ERROR)	4.76	4.92	1.43	12.34
OVERALL STD DEV (S)	3.00	3.25	5.44	4.84
OVERALL REL STD DEV, %	8.30	11.21	15.54	15.62
SINGLE STD DEV, (SR)	1.47		3.93	
ANALYST REL DEV, %	4.52		11.90	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR POTASSIUM, K ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	8	7
TRUE CONC (C) MG/L	0.47	0.33	0.47	0.33
MEAN RECOVERY (X)	0.42	0.27	0.44	0.32
ACCURACY(%REL ERROR)	-9.65	-16.67	-5.40	-4.16
OVERALL STD DEV (S)	0.06	0.09	0.06	0.02
OVERALL REL STD DEV, %	14.72	32.87	14.44	5.50
SINGLE STD DEV, (SR)	0.04		0.06	
ANALYST REL DEV, %	10.11		14.68	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	7	8	8
TRUE CONC (C) MG/L	5.72	4.35	5.72	4.35
MEAN RECOVERY (X)	5.83	4.33	5.69	4.26
ACCURACY(%REL ERROR)	1.90	-0.43	-0.44	-2.00
OVERALL STD DEV (S)	0.49	0.42	0.54	0.45
OVERALL REL STD DEV, %	8.35	9.77	9.52	10.64
SINGLE STD DEV, (SR)	0.36		0.34	
ANALYST REL DEV, %	7.16		6.87	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	8	8
TRUE CONC (C) MG/L	14.20	11.50	14.20	11.50
MEAN RECOVERY (X)	14.71	12.36	13.83	11.44
ACCURACY(%REL ERROR)	3.61	7.50	-2.59	-0.52
OVERALL STD DEV (S)	1.10	0.98	1.03	1.04
OVERALL REL STD DEV, %	7.47	7.89	7.42	9.07
SINGLE STD DEV, (SR)	0.71		0.55	
ANALYST REL DEV, %	5.25		4.37	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR POTASSIUM, K ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	6	6
TRUE CONC (C) MG/L	0.47	0.33	0.47	0.33
MEAN RECOVERY (X)	0.43	0.31	0.52	0.34
ACCURACY(%REL ERROR)	-8.81	-7.45	9.68	2.68
OVERALL STD DEV (S)	0.12	0.10	0.07	0.09
OVERALL REL STD DEV, %	27.86	33.61	13.25	25.94
SINGLE ANALYST STD DEV, (SR)	0.04		0.08	
SINGLE ANALYST REL DEV, %	11.82		18.39	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	6	6
TRUE CONC (C) MG/L	5.72	4.35	5.72	4.35
MEAN RECOVERY (X)	6.50	4.90	6.94	4.94
ACCURACY(%REL ERROR)	13.64	12.55	21.26	13.65
OVERALL STD DEV (S)	0.63	0.35	0.79	0.44
OVERALL REL STD DEV, %	9.75	7.06	11.33	9.00
SINGLE ANALYST STD DEV, (SR)	0.24		0.35	
SINGLE ANALYST REL DEV, %	4.21		5.86	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	5	6
TRUE CONC (C) MG/L	14.20	11.50	14.20	11.50
MEAN RECOVERY (X)	16.27	12.83	16.87	13.63
ACCURACY(%REL ERROR)	14.59	11.56	18.79	18.49
OVERALL STD DEV (S)	1.10	1.20	0.33	1.40
OVERALL REL STD DEV, %	6.73	9.33	1.97	10.30
SINGLE ANALYST STD DEV, (SR)	0.66		0.80	
SINGLE ANALYST REL DEV, %	4.54		5.23	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR MAGNESIUM, MG ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	8	8	8
TRUE CONC (C) MG/L	37.50	30.00	37.50	30.00
MEAN RECOVERY (X)	37.86	30.08	34.42	28.64
ACCURACY(%REL ERROR)	0.95	0.28	-8.23	-4.55
OVERALL STD DEV (S)	1.61	3.38	3.00	2.83
OVERALL REL STD DEV, %	4.26	11.24	8.70	9.88
SINGLE STD DEV, (SR)	1.69		1.20	
ANALYST REL DEV, %	4.97		3.82	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	8	8
TRUE CONC (C) MG/L	62.50	50.00	62.50	50.00
MEAN RECOVERY (X)	62.11	50.06	57.10	46.68
ACCURACY(%REL ERROR)	-0.62	0.12	-8.65	-6.63
OVERALL STD DEV (S)	4.21	3.84	7.26	6.45
OVERALL REL STD DEV, %	6.78	7.67	12.71	13.81
SINGLE STD DEV, (SR)	0.86		1.55	
ANALYST REL DEV, %	1.54		2.98	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	8	8
TRUE CONC (C) MG/L	125.00	113.00	125.00	113.00
MEAN RECOVERY (X)	120.50	109.84	114.99	102.97
ACCURACY(%REL ERROR)	-3.60	-2.80	-8.01	-8.88
OVERALL STD DEV (S)	8.70	6.55	14.38	13.64
OVERALL REL STD DEV, %	7.22	5.97	12.50	13.25
SINGLE STD DEV, (SR)	2.27		2.64	
ANALYST REL DEV, %	1.97		2.42	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR MAGNESIUM, MG ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	8	6	6
TRUE CONC (C) MG/L	4.50	5.00	4.50	5.00
MEAN RECOVERY (X)	7.57	4.91	7.06	4.68
ACCURACY(%REL ERROR)	68.33	-1.83	56.98	-6.49
OVERALL STD DEV (S)	0.24	0.36	0.23	0.23
OVERALL REL STD DEV, %	3.22	7.25	3.21	4.89
SINGLE ANALYST STD DEV, (SR)	0.16		0.17	
SINGLE ANALYST REL DEV, %	2.55		2.91	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	6	7	7	6
TRUE CONC (C) MG/L	12.50	10.00	12.50	10.00
MEAN RECOVERY (X)	12.82	10.10	12.42	9.59
ACCURACY(%REL ERROR)	2.54	1.00	-0.60	-4.05
OVERALL STD DEV (S)	0.20	0.31	0.78	0.35
OVERALL REL STD DEV, %	1.59	3.06	6.32	3.63
SINGLE ANALYST STD DEV, (SR)	0.23		0.45	
SINGLE ANALYST REL DEV, %	2.00		4.09	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	30.00	25.50	30.00	25.50
MEAN RECOVERY (X)	29.78	24.98	27.19	26.90
ACCURACY(%REL ERROR)	-0.73	-2.05	-9.37	5.49
OVERALL STD DEV (S)	1.73	1.00	1.13	1.46
OVERALL REL STD DEV, %	5.81	4.00	4.17	5.43
SINGLE ANALYST STD DEV, (SR)	0.59		0.33	
SINGLE ANALYST REL DEV, %	2.14		1.22	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR MAGNESIUM, MG ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	7.50	5.00	7.50	5.00
MEAN RECOVERY (X)	7.52	5.02	7.08	4.93
ACCURACY(%REL ERROR)	0.23	0.33	-5.58	-1.39
OVERALL STD DEV (S)	0.24	0.20	0.77	0.48
OVERALL REL STD DEV, %	3.25	4.09	10.85	9.82
SINGLE STD DEV, (SR)	0.16		0.66	
ANALYST REL DEV, %	2.60		10.92	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	8	6	7
TRUE CONC (C) MG/L	12.50	10.00	12.50	10.00
MEAN RECOVERY (X)	12.47	9.91	12.11	8.97
ACCURACY(%REL ERROR)	-0.21	-0.87	-3.11	-10.34
OVERALL STD DEV (S)	0.40	0.30	0.58	0.98
OVERALL REL STD DEV, %	3.20	3.00	4.78	10.90
SINGLE STD DEV, (SR)	0.20		0.42	
ANALYST REL DEV, %	1.75		3.98	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	30.00	25.00	30.00	25.00
MEAN RECOVERY (X)	29.02	23.67	27.70	23.84
ACCURACY(%REL ERROR)	-3.27	-5.31	-7.65	-4.63
OVERALL STD DEV (S)	1.94	2.00	3.93	2.11
OVERALL REL STD DEV, %	6.67	8.46	14.18	8.83
SINGLE STD DEV, (SR)	0.68		2.13	
ANALYST REL DEV, %	2.57		8.27	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR MANGANESE, MN ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	6	6
TRUE CONC (C) MG/L	0.11	0.08	0.11	0.08
MEAN RECOVERY (X)	0.11	0.08	0.11	0.08
ACCURACY(%REL ERROR)	1.14	0.15	1.21	0.99
OVERALL STD DEV (S)	0.02	0.02	0.01	0.01
OVERALL REL STD DEV, %	19.16	23.17	6.16	9.62
SINGLE STD DEV, (SR)	0.01		0.00	
ANALYST REL DEV, %	8.04		3.99	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	6	6
TRUE CONC (C) MG/L	0.84	0.67	0.84	0.67
MEAN RECOVERY (X)	0.83	0.66	0.85	0.67
ACCURACY(%REL ERROR)	-1.19	-2.05	1.17	0.57
OVERALL STD DEV (S)	0.04	0.04	0.07	0.02
OVERALL REL STD DEV, %	4.92	6.15	8.13	3.05
SINGLE STD DEV, (SR)	0.01		0.04	
ANALYST REL DEV, %	0.68		5.63	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	5	6
TRUE CONC (C) MG/L	3.35	2.79	3.35	2.79
MEAN RECOVERY (X)	3.28	2.76	3.36	2.76
ACCURACY(%REL ERROR)	-2.10	-1.15	0.36	-1.06
OVERALL STD DEV (S)	0.24	0.19	0.18	0.17
OVERALL REL STD DEV, %	7.41	7.06	5.43	6.02
SINGLE STD DEV, (SR)	0.06		0.03	
ANALYST REL DEV, %	1.95		0.86	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR MANGANESE, MN ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	6	7
TRUE CONC (C) MG/L	1.39	1.12	1.39	1.12
MEAN RECOVERY (X)	1.40	1.13	1.38	1.08
ACCURACY(%REL ERROR)	0.47	1.21	-1.03	-3.71
OVERALL STD DEV (S)	0.06	0.06	0.09	0.07
OVERALL REL STD DEV, %	4.22	5.30	6.68	6.62
SINGLE STD DEV, (SR)	0.06		0.06	
ANALYST REL DEV, %	4.46		5.10	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	1.95	1.67	1.95	1.67
MEAN RECOVERY (X)	1.98	1.69	1.93	1.68
ACCURACY(%REL ERROR)	1.50	1.39	-0.91	0.51
OVERALL STD DEV (S)	0.11	0.08	0.12	0.08
OVERALL REL STD DEV, %	5.37	4.73	6.18	4.96
SINGLE STD DEV, (SR)	0.02		0.07	
ANALYST REL DEV, %	1.26		4.05	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	3.90	3.35	3.90	3.35
MEAN RECOVERY (X)	3.89	3.47	3.64	3.46
ACCURACY(%REL ERROR)	-0.35	3.62	-6.61	3.33
OVERALL STD DEV (S)	0.33	0.22	0.19	0.28
OVERALL REL STD DEV, %	8.49	6.43	5.34	8.07
SINGLE STD DEV, (SR)	0.30		0.24	
ANALYST REL DEV, %	8.19		6.82	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR MANGANESE, MN ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	0.11	0.08	0.11	0.08
MEAN RECOVERY (X)	0.12	0.09	0.10	0.07
ACCURACY(%REL ERROR)	8.05	7.82	-7.27	-15.31
OVERALL STD DEV (S)	0.02	0.03	0.02	0.01
OVERALL REL STD DEV, %	14.63	28.95	22.07	20.00
SINGLE STD DEV, (SR)	0.02		0.01	
ANALYST REL DEV, %	22.84		9.14	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	0.84	0.67	0.84	0.67
MEAN RECOVERY (X)	0.86	0.66	0.82	0.65
ACCURACY(%REL ERROR)	2.23	-0.83	-2.91	-2.49
OVERALL STD DEV (S)	0.06	0.05	0.05	0.05
OVERALL REL STD DEV, %	7.36	6.92	6.71	8.31
SINGLE STD DEV, (SR)	0.02		0.02	
ANALYST REL DEV, %	3.18		2.70	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	6	6
TRUE CONC (C) MG/L	3.35	2.79	3.35	2.79
MEAN RECOVERY (X)	3.40	2.87	3.42	2.35
ACCURACY(%REL ERROR)	1.36	2.80	2.01	2.31
OVERALL STD DEV (S)	0.29	0.22	0.13	0.13
OVERALL REL STD DEV, %	8.62	7.69	3.38	4.53
SINGLE STD DEV, (SR)	0.06		0.04	
ANALYST REL DEV, %	1.77		1.37	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR MOLYBDENUM, MO ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	9	9	9	9
TRUE CONC (C) MG/L	1.12	0.75	1.12	0.75
MEAN RECOVERY (X)	1.07	0.68	1.16	0.74
ACCURACY(%REL ERROR)	-4.54	-8.71	3.96	-0.68
OVERALL STD DEV (S)	0.22	0.23	0.23	0.18
OVERALL REL STD DEV, %	20.42	33.60	19.61	24.48
SINGLE STD DEV, (SR)	0.09		0.11	
ANALYST REL DEV, %	9.88		11.59	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	9	9	9	9
TRUE CONC (C) MG/L	15.00	11.30	15.00	11.30
MEAN RECOVERY (X)	14.38	10.83	14.52	10.96
ACCURACY(%REL ERROR)	-4.11	-4.14	-3.18	-3.04
OVERALL STD DEV (S)	3.01	2.00	2.39	1.73
OVERALL REL STD DEV, %	20.90	18.43	16.46	15.81
SINGLE STD DEV, (SR)	0.74		0.66	
ANALYST REL DEV, %	5.86		5.14	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	9	9	9	9
TRUE CONC (C) MG/L	37.50	30.00	37.50	30.00
MEAN RECOVERY (X)	35.34	27.99	35.89	29.01
ACCURACY(%REL ERROR)	-5.77	-6.71	-4.30	-3.31
OVERALL STD DEV (S)	9.55	7.27	8.65	6.26
OVERALL REL STD DEV, %	27.04	25.97	24.10	21.60
SINGLE STD DEV, (SR)	1.74		1.98	
ANALYST REL DEV, %	5.51		6.11	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR MOLYBDENUM, MO ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	9	9
TRUE CONC (C) MG/L	1.12	0.75	1.12	0.75
MEAN RECOVERY (X)	1.08	0.73	1.19	0.80
ACCURACY(%REL ERROR)	-3.17	-2.53	6.69	7.02
OVERALL STD DEV (S)	0.09	0.10	0.14	0.08
OVERALL REL STD DEV, %	8.11	13.73	12.12	9.68
SINGLE STD DEV, (SR)	0.03		0.06	
ANALYST REL DEV, %	3.85		5.89	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	9	9
TRUE CONC (C) MG/L	15.00	11.20	15.00	11.20
MEAN RECOVERY (X)	15.19	11.25	15.21	11.26
ACCURACY(%REL ERROR)	1.25	0.45	1.42	0.57
OVERALL STD DEV (S)	1.94	1.79	2.33	1.95
OVERALL REL STD DEV, %	12.80	15.89	15.28	17.31
SINGLE STD DEV, (SR)	0.27		0.53	
ANALYST REL DEV, %	2.03		4.02	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	9	9
TRUE CONC (C) MG/L	37.50	30.00	37.50	30.00
MEAN RECOVERY (X)	37.47	30.50	37.63	29.97
ACCURACY(%REL ERROR)	-0.09	1.66	0.33	-0.09
OVERALL STD DEV (S)	4.70	4.58	5.50	4.69
OVERALL REL STD DEV, %	12.54	15.01	14.62	15.64
SINGLE STD DEV, (SR)	1.47		1.18	
ANALYST REL DEV, %	4.34		3.49	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR MOLYBDENUM, MO ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	1.12	0.75	1.12	0.75
MEAN RECOVERY (X)	1.19	0.79	1.29	0.84
ACCURACY(%REL ERROR)	6.02	5.02	14.81	12.57
OVERALL STD DEV (S)	0.11	0.12	0.11	0.07
OVERALL REL STD DEV, %	9.14	15.84	8.55	8.03
SINGLE STD DEV, (SR)	0.07		0.05	
ANALYST REL DEV, %	7.06		5.10	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	15.00	11.20	15.00	11.20
MEAN RECOVERY (X)	17.36	12.67	16.79	12.53
ACCURACY(%REL ERROR)	15.73	13.15	11.93	11.87
OVERALL STD DEV (S)	2.28	1.53	1.90	1.70
OVERALL REL STD DEV, %	13.11	12.08	11.31	13.59
SINGLE STD DEV, (SR)	0.66		0.33	
ANALYST REL DEV, %	4.37		2.23	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	37.50	30.00	37.50	30.00
MEAN RECOVERY (X)	42.90	34.12	41.86	34.85
ACCURACY(%REL ERROR)	14.41	13.74	11.63	16.18
OVERALL STD DEV (S)	3.57	3.34	3.85	4.43
OVERALL REL STD DEV, %	8.32	9.79	9.19	12.72
SINGLE STD DEV, (SR)	0.79		1.19	
ANALYST REL DEV, %	2.34		3.11	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR SODIUM, NA ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	41.30	27.50	41.30	27.50
MEAN RECOVERY (X)	40.78	27.19	36.41	26.26
ACCURACY(%REL ERROR)	-1.26	-1.14	-11.83	-4.50
OVERALL STD DEV (S)	1.45	1.11	2.16	2.17
OVERALL REL STD DEV, %	3.56	4.09	5.94	8.28
SINGLE STD DEV, (SR)	0.59		1.38	
ANALYST REL DEV, %	1.74		4.41	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	68.80	55.00	68.80	55.00
MEAN RECOVERY (X)	67.50	53.89	65.78	53.04
ACCURACY(%REL ERROR)	-1.86	-2.02	-4.39	-3.57
OVERALL STD DEV (S)	2.26	1.56	2.59	3.86
OVERALL REL STD DEV, %	3.35	2.89	3.94	7.27
SINGLE STD DEV, (SR)	0.88		1.78	
ANALYST REL DEV, %	1.45		2.99	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	8	7
TRUE CONC (C) MG/L	110.00	82.50	110.00	82.50
MEAN RECOVERY (X)	108.75	76.97	105.32	77.58
ACCURACY(%REL ERROR)	-1.13	-6.71	-4.25	-5.97
OVERALL STD DEV (S)	3.14	5.43	4.74	2.66
OVERALL REL STD DEV, %	2.89	7.06	4.50	3.43
SINGLE STD DEV, (SR)	5.94		2.34	
ANALYST REL DEV, %	6.39		2.55	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR SODIUM, NA ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	5	6	6
TRUE CONC (C) MG/L	13.80	11.00	13.80	11.00
MEAN RECOVERY (X)	13.34	10.11	13.49	10.65
ACCURACY(%REL ERROR)	-3.35	-8.12	-2.25	-3.14
OVERALL STD DEV (S)	0.56	0.26	0.44	0.52
OVERALL REL STD DEV, %	4.19	2.61	3.26	4.91
SINGLE STD DEV, (SR)	0.39		0.12	
ANALYST REL DEV, %	3.36		1.02	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	6	6	6	6
TRUE CONC (C) MG/L	22.00	16.50	22.00	16.50
MEAN RECOVERY (X)	21.13	15.85	21.26	15.83
ACCURACY(%REL ERROR)	-3.97	-3.93	-3.37	-4.06
OVERALL STD DEV (S)	0.74	0.50	1.47	0.95
OVERALL REL STD DEV, %	3.49	3.14	6.91	6.03
SINGLE STD DEV, (SR)	0.22		0.65	
ANALYST REL DEV, %	1.19		3.50	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	6	6	6	6
TRUE CONC (C) MG/L	41.30	33.00	41.30	33.00
MEAN RECOVERY (X)	40.69	32.41	36.47	33.30
ACCURACY(%REL ERROR)	-1.47	-1.78	-11.70	2.43
OVERALL STD DEV (S)	1.51	1.48	1.52	1.17
OVERALL REL STD DEV, %	3.72	4.56	4.16	3.48
SINGLE STD DEV, (SR)	0.52		0.35	
ANALYST REL DEV, %	1.42		0.99	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR SODIUM, NA ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	8	6	4
TRUE CONC (C) MG/L	688.00	550.00	688.00	550.00
MEAN RECOVERY (X)	684.63	569.08	727.11	540.50
ACCURACY(%REL ERROR)	-0.49	3.47	5.69	-1.73
OVERALL STD DEV (S)	14.56	31.03	172.71	11.47
OVERALL REL STD DEV, %	2.13	5.45	23.75	2.12
SINGLE STD DEV, (SR)	23.02		119.85	
ANALYST REL DEV, %	3.67		18.91	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	6	6
TRUE CONC (C) MG/L	1240.00	1100.00	1240.00	1100.00
MEAN RECOVERY (X)	1248.49	1058.65	1337.25	1221.40
ACCURACY(%REL ERROR)	0.68	-3.76	7.84	11.04
OVERALL STD DEV (S)	65.96	48.49	287.05	168.79
OVERALL REL STD DEV, %	5.28	4.58	21.47	13.82
SINGLE STD DEV, (SR)	66.37		153.29	
ANALYST REL DEV, %	5.75		11.98	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	6	6
TRUE CONC (C) MG/L	2750.00	2200.00	2750.00	2200.00
MEAN RECOVERY (X)	2812.56	2137.75	2780.75	2241.42
ACCURACY(%REL ERROR)	2.27	-2.83	1.12	1.88
OVERALL STD DEV (S)	100.68	92.57	89.60	236.27
OVERALL REL STD DEV, %	3.58	4.33	3.22	10.54
SINGLE STD DEV, (SR)	111.66		137.74	
ANALYST REL DEV, %	4.51		5.49	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR NICKEL, NI ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	0.30	0.25	0.30	0.25
MEAN RECOVERY (X)	0.31	0.24	0.27	0.24
ACCURACY(%REL ERROR)	1.79	-4.15	-10.38	-2.06
OVERALL STD DEV (S)	0.02	0.02	0.05	0.06
OVERALL REL STD DEV, %	5.92	9.71	17.42	24.12
SINGLE STD DEV, (SR)	0.02		0.01	
ANALYST REL DEV, %	6.59		3.88	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	2.00	1.50	2.00	1.50
MEAN RECOVERY (X)	1.98	1.49	1.96	1.49
ACCURACY(%REL ERROR)	-0.84	-0.66	-1.75	-0.33
OVERALL STD DEV (S)	0.06	0.05	0.09	0.06
OVERALL REL STD DEV, %	2.83	3.39	4.49	3.85
SINGLE STD DEV, (SR)	0.03		0.03	
ANALYST REL DEV, %	1.60		1.78	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	7	7	7
TRUE CONC (C) MG/L	5.50	4.50	5.50	4.50
MEAN RECOVERY (X)	5.57	4.48	5.48	4.43
ACCURACY(%REL ERROR)	1.29	-0.44	-0.35	-1.55
OVERALL STD DEV (S)	0.31	0.04	0.30	0.14
OVERALL REL STD DEV, %	5.50	0.83	5.50	3.19
SINGLE STD DEV, (SR)	0.18		0.18	
ANALYST REL DEV, %	3.60		3.61	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR NICKEL, NI ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	9	8
TRUE CONC (C) MG/L	0.30	0.25	0.30	0.25
MEAN RECOVERY (X)	0.27	0.24	0.28	0.21
ACCURACY(%REL ERROR)	-10.19	-5.14	-6.37	-17.40
OVERALL STD DEV (S)	0.06	0.02	0.06	0.07
OVERALL REL STD DEV, %	20.93	10.25	19.62	33.30
SINGLE STD DEV, (SR)	0.04		0.04	
ANALYST REL DEV, %	14.00		17.50	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	9	8
TRUE CONC (C) MG/L	2.00	1.50	2.00	1.50
MEAN RECOVERY (X)	2.02	1.49	1.99	1.49
ACCURACY(%REL ERROR)	0.84	-0.41	-0.30	-0.47
OVERALL STD DEV (S)	0.12	0.09	0.14	0.06
OVERALL REL STD DEV, %	6.02	6.03	7.14	4.07
SINGLE STD DEV, (SR)	0.05		0.05	
ANALYST REL DEV, %	3.04		3.04	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	9	9
TRUE CONC (C) MG/L	5.50	4.50	5.50	4.50
MEAN RECOVERY (X)	5.52	4.54	5.45	4.44
ACCURACY(%REL ERROR)	0.41	0.80	-0.86	-1.35
OVERALL STD DEV (S)	0.29	0.26	0.35	0.27
OVERALL REL STD DEV, %	5.31	5.68	6.45	6.10
SINGLE STD DEV, (SR)	0.10		0.12	
ANALYST REL DEV, %	2.02		2.43	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR NICKEL, NI ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	9	9	7	7
TRUE CONC (C) MG/L	5.50	4.50	5.50	4.50
MEAN RECOVERY (X)	5.51	4.43	6.44	4.37
ACCURACY(%REL ERROR)	0.24	-1.49	17.09	8.18
OVERALL STD DEV (S)	0.33	0.11	0.28	0.33
OVERALL REL STD DEV, %	6.07	2.56	4.37	6.69
SINGLE STD DEV, (SR)	0.21		0.17	
ANALYST REL DEV, %	4.20		3.02	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	9	8	6	6
TRUE CONC (C) MG/L	12.50	10.00	12.50	10.00
MEAN RECOVERY (X)	12.46	9.91	12.51	10.07
ACCURACY(%REL ERROR)	-0.30	-0.87	0.06	0.73
OVERALL STD DEV (S)	0.38	0.66	0.83	0.26
OVERALL REL STD DEV, %	3.04	6.70	6.65	2.63
SINGLE STD DEV, (SR)	0.24		0.49	
ANALYST REL DEV, %	2.11		4.32	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	9	9	7	7
TRUE CONC (C) MG/L	27.50	22.50	27.50	22.50
MEAN RECOVERY (X)	27.03	22.44	27.34	22.96
ACCURACY(%REL ERROR)	-1.71	-0.27	1.24	2.06
OVERALL STD DEV (S)	1.04	0.86	3.32	2.60
OVERALL REL STD DEV, %	3.83	3.85	11.92	11.31
SINGLE STD DEV, (SR)	0.65		0.70	
ANALYST REL DEV, %	2.62		2.76	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR LEAD, PB ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	8	7	7
TRUE CONC (C) MG/L	1.13	0.75	1.13	0.75
MEAN RECOVERY (X)	1.20	0.77	1.23	0.81
ACCURACY(%REL ERROR)	6.35	2.40	8.87	8.61
OVERALL STD DEV (S)	0.03	0.12	0.05	0.03
OVERALL REL STD DEV, %	2.44	15.17	3.71	4.22
SINGLE ANALYST STD DEV, (SR)	0.05		0.04	
SINGLE ANALYST REL DEV, %	5.50		3.72	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	8	7
TRUE CONC (C) MG/L	7.50	5.63	7.50	5.63
MEAN RECOVERY (X)	7.79	5.89	7.38	5.56
ACCURACY(%REL ERROR)	3.81	4.54	-1.59	-1.31
OVERALL STD DEV (S)	0.54	0.27	0.35	0.14
OVERALL REL STD DEV, %	6.97	4.63	4.69	2.56
SINGLE ANALYST STD DEV, (SR)	0.21		0.16	
SINGLE ANALYST REL DEV, %	3.12		2.42	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	8	8
TRUE CONC (C) MG/L	18.80	15.00	18.80	15.00
MEAN RECOVERY (X)	19.34	15.45	17.78	13.84
ACCURACY(%REL ERROR)	2.80	2.97	-5.43	-7.75
OVERALL STD DEV (S)	1.44	0.61	1.49	0.71
OVERALL REL STD DEV, %	7.47	3.96	8.36	5.15
SINGLE ANALYST STD DEV, (SR)	0.88		0.58	
SINGLE ANALYST REL DEV, %	5.06		3.69	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR LEAD, PB ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	7	6
TRUE CONC (C) MG/L	1.13	0.75	1.13	0.75
MEAN RECOVERY (X)	1.19	0.78	1.14	0.81
ACCURACY(%REL ERROR)	4.99	3.85	1.13	8.31
OVERALL STD DEV (S)	0.10	0.04	0.12	0.07
OVERALL REL STD DEV, %	8.22	5.77	10.10	8.02
SINGLE STD DEV, (SR)	0.06		0.02	
ANALYST REL DEV, %	6.39		1.74	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	7.50	5.63	7.50	5.63
MEAN RECOVERY (X)	7.75	5.73	7.72	5.75
ACCURACY(%REL ERROR)	3.31	1.78	2.90	2.21
OVERALL STD DEV (S)	0.38	0.28	0.28	0.26
OVERALL REL STD DEV, %	4.90	4.90	3.63	4.50
SINGLE STD DEV, (SR)	0.12		0.23	
ANALYST REL DEV, %	1.80		3.44	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	18.80	15.00	18.80	15.00
MEAN RECOVERY (X)	19.32	15.28	18.98	15.16
ACCURACY(%REL ERROR)	2.77	1.87	0.95	1.06
OVERALL STD DEV (S)	0.37	0.86	0.89	0.55
OVERALL REL STD DEV, %	1.92	5.63	4.68	3.66
SINGLE STD DEV, (SR)	0.67		0.32	
ANALYST REL DEV, %	3.86		1.66	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR LEAD, PB ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	8	6	6
TRUE CONC (C) MG/L	1.13	0.75	1.13	0.75
MEAN RECOVERY (X)	1.17	0.79	1.10	0.69
ACCURACY(%REL ERROR)	3.30	5.53	-2.68	-8.42
OVERALL STD DEV (S)	0.07	0.18	0.08	0.03
OVERALL REL STD DEV, %	5.71	23.09	7.15	5.07
SINGLE ANALYST STD DEV, (SR)	0.08		0.07	
SINGLE ANALYST REL DEV, %	8.45		7.76	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	7.50	5.63	7.50	5.63
MEAN RECOVERY (X)	7.80	5.79	6.17	4.97
ACCURACY(%REL ERROR)	4.01	2.82	-17.77	-11.81
OVERALL STD DEV (S)	0.39	0.29	0.61	0.29
OVERALL REL STD DEV, %	4.95	4.98	9.82	5.91
SINGLE ANALYST STD DEV, (SR)	0.15		0.25	
SINGLE ANALYST REL DEV, %	2.14		4.46	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	7	7	7
TRUE CONC (C) MG/L	18.80	15.00	18.80	15.00
MEAN RECOVERY (X)	19.35	15.72	13.64	12.71
ACCURACY(%REL ERROR)	2.92	4.78	-27.44	-15.25
OVERALL STD DEV (S)	0.74	0.49	0.91	0.72
OVERALL REL STD DEV, %	3.80	3.14	6.70	5.68
SINGLE ANALYST STD DEV, (SR)	0.33		0.68	
SINGLE ANALYST REL DEV, %	1.38		5.17	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR ANTIMONY, SB ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	1.13	0.75	1.13	0.75
MEAN RECOVERY (X)	1.32	0.95	1.30	0.88
ACCURACY(%REL ERROR)	16.66	26.22	14.68	17.20
OVERALL STD DEV (S)	0.23	0.24	0.21	0.17
OVERALL REL STD DEV, %	17.13	25.33	16.25	19.61
SINGLE STD DEV, (SR)	0.06		0.07	
ANALYST REL DEV, %	5.05		6.37	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	8	7	7
TRUE CONC (C) MG/L	15.00	11.30	15.00	11.30
MEAN RECOVERY (X)	16.04	11.79	16.27	11.95
ACCURACY(%REL ERROR)	6.91	4.31	8.45	5.79
OVERALL STD DEV (S)	0.65	0.35	0.82	0.69
OVERALL REL STD DEV, %	4.07	7.22	5.02	5.81
SINGLE STD DEV, (SR)	0.22		0.43	
ANALYST REL DEV, %	1.56		3.03	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	37.50	30.00	37.50	30.00
MEAN RECOVERY (X)	38.92	31.33	39.21	31.83
ACCURACY(%REL ERROR)	3.78	4.44	4.57	6.08
OVERALL STD DEV (S)	2.00	1.47	1.94	1.45
OVERALL REL STD DEV, %	5.15	4.69	4.95	4.55
SINGLE STD DEV, (SR)	0.45		1.32	
ANALYST REL DEV, %	1.29		3.73	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR ANTIMONY, 88 ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	9	6	6
TRUE CONC (C) MG/L	1.13	0.75	1.13	0.75
MEAN RECOVERY (X)	1.16	0.87	1.05	0.77
ACCURACY(%REL ERROR)	3.10	16.07	-7.15	2.44
OVERALL STD DEV (S)	0.07	0.13	0.23	0.17
OVERALL REL STD DEV, %	6.17	14.58	22.15	21.60
SINGLE STD DEV, (SR)	0.11		0.14	
ANALYST REL DEV, %	10.47		14.95	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	9	6	6
TRUE CONC (C) MG/L	15.00	11.30	15.00	11.30
MEAN RECOVERY (X)	15.84	11.82	15.55	11.55
ACCURACY(%REL ERROR)	5.59	4.58	3.69	2.25
OVERALL STD DEV (S)	1.09	0.57	0.87	0.83
OVERALL REL STD DEV, %	6.88	4.85	5.62	7.19
SINGLE STD DEV, (SR)	0.41		0.18	
ANALYST REL DEV, %	2.99		1.33	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	9	9	6	6
TRUE CONC (C) MG/L	37.50	30.00	37.50	30.00
MEAN RECOVERY (X)	39.69	32.04	38.40	30.69
ACCURACY(%REL ERROR)	5.85	6.80	2.40	2.31
OVERALL STD DEV (S)	2.20	1.12	1.46	1.64
OVERALL REL STD DEV, %	5.55	3.49	3.81	5.34
SINGLE STD DEV, (SR)	1.38		0.34	
ANALYST REL DEV, %	3.65		0.98	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR ANTIMONY, SB ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	1.13	0.75	1.13	0.75
MEAN RECOVERY (X)	1.19	0.82	1.12	0.77
ACCURACY(%REL ERROR)	5.08	9.56	-0.51	2.55
OVERALL STD DEV (S)	0.12	0.09	0.23	0.13
OVERALL REL STD DEV, %	10.49	10.59	20.24	17.00
SINGLE STD DEV, (SR)	0.10		0.15	
ANALYST REL DEV, %	9.96		15.42	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	6	7
TRUE CONC (C) MG/L	15.00	11.30	15.00	11.30
MEAN RECOVERY (X)	15.88	11.84	15.53	11.49
ACCURACY(%REL ERROR)	5.86	4.80	3.57	1.70
OVERALL STD DEV (S)	0.80	0.38	0.24	0.53
OVERALL REL STD DEV, %	5.02	3.21	1.52	4.59
SINGLE STD DEV, (SR)	0.34		0.25	
ANALYST REL DEV, %	2.45		1.88	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	7
TRUE CONC (C) MG/L	37.50	30.00	37.50	30.00
MEAN RECOVERY (X)	39.10	31.93	38.82	31.26
ACCURACY(%REL ERROR)	4.26	6.43	3.51	4.21
OVERALL STD DEV (S)	1.18	1.52	1.06	1.41
OVERALL REL STD DEV, %	3.03	4.76	2.74	4.50
SINGLE STD DEV, (SR)	0.94		0.37	
ANALYST REL DEV, %	2.64		1.05	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR VANADIUM, V ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	2.81	1.88	2.81	1.88
MEAN RECOVERY (X)	2.78	1.82	2.93	1.99
ACCURACY(%REL ERROR)	-1.10	-3.15	4.23	5.93
OVERALL STD DEV (S)	0.15	0.17	0.51	0.42
OVERALL REL STD DEV, %	5.38	9.35	17.56	20.87
SINGLE ANALYST STD DEV, (SR)	0.15		0.14	
SINGLE ANALYST REL DEV, %	6.54		5.50	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	46.90	37.50	46.90	37.50
MEAN RECOVERY (X)	48.88	41.14	52.54	41.70
ACCURACY(%REL ERROR)	4.22	9.72	12.02	11.19
OVERALL STD DEV (S)	5.65	5.27	7.32	6.61
OVERALL REL STD DEV, %	11.55	12.81	13.93	15.85
SINGLE ANALYST STD DEV, (SR)	3.48		1.17	
SINGLE ANALYST REL DEV, %	7.74		2.48	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	8	8
TRUE CONC (C) MG/L	93.80	75.00	93.80	75.00
MEAN RECOVERY (X)	96.59	76.97	99.38	80.51
ACCURACY(%REL ERROR)	2.98	2.62	6.49	7.34
OVERALL STD DEV (S)	11.55	9.85	10.65	8.11
OVERALL REL STD DEV, %	11.95	12.79	10.66	10.07
SINGLE ANALYST STD DEV, (SR)	1.58		2.33	
SINGLE ANALYST REL DEV, %	1.32		2.58	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR VANADIUM, V ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	2.81	1.88	2.81	1.88
MEAN RECOVERY (X)	2.86	1.94	2.78	1.87
ACCURACY(%REL ERROR)	1.81	3.20	-0.89	-0.71
OVERALL STD DEV (S)	0.28	0.29	0.24	0.18
OVERALL REL STD DEV, %	9.66	15.12	8.66	9.82
SINGLE STD DEV, (SR)	0.14		0.12	
ANALYST REL DEV, %	6.03		5.06	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	46.90	37.50	46.90	37.50
MEAN RECOVERY (X)	49.26	40.01	50.40	40.07
ACCURACY(%REL ERROR)	5.04	6.69	7.46	6.85
OVERALL STD DEV (S)	3.72	5.53	5.05	5.78
OVERALL REL STD DEV, %	7.55	13.83	10.01	14.44
SINGLE STD DEV, (SR)	2.33		1.54	
ANALYST REL DEV, %	5.23		3.41	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	6	6	7	7
TRUE CONC (C) MG/L	93.80	75.00	93.80	75.00
MEAN RECOVERY (X)	98.23	76.42	96.62	76.83
ACCURACY(%REL ERROR)	4.73	1.89	3.01	2.44
OVERALL STD DEV (S)	4.97	6.06	10.60	5.89
OVERALL REL STD DEV, %	5.06	7.93	10.97	7.67
SINGLE STD DEV, (SR)	1.81		4.10	
ANALYST REL DEV, %	2.07		4.73	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR VANADIUM, V ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	6	5	6	6
TRUE CONC (C) MG/L	2.81	1.88	2.81	1.88
MEAN RECOVERY (X)	2.91	2.00	3.04	1.92
ACCURACY(%REL ERROR)	3.61	6.34	8.13	2.04
OVERALL STD DEV (S)	0.12	0.03	0.26	0.19
OVERALL REL STD DEV, %	4.23	1.70	8.68	10.13
SINGLE STD DEV, (SR)	0.08		0.17	
ANALYST REL DEV, %	3.41		6.78	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	6	6	6	6
TRUE CONC (C) MG/L	46.90	37.50	46.90	37.50
MEAN RECOVERY (X)	50.01	41.25	51.55	40.88
ACCURACY(%REL ERROR)	6.64	9.99	9.91	9.02
OVERALL STD DEV (S)	5.27	4.62	6.61	5.40
OVERALL REL STD DEV, %	10.54	11.20	12.81	13.20
SINGLE STD DEV, (SR)	3.54		0.91	
ANALYST REL DEV, %	7.75		1.97	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	6	6	6	6
TRUE CONC (C) MG/L	93.80	75.00	93.80	75.00
MEAN RECOVERY (X)	102.60	83.07	102.67	79.78
ACCURACY(%REL ERROR)	9.38	10.76	9.45	6.38
OVERALL STD DEV (S)	9.30	7.92	8.65	9.44
OVERALL REL STD DEV, %	9.07	9.53	8.43	11.83
SINGLE STD DEV, (SR)	4.27		2.14	
ANALYST REL DEV, %	4.60		2.35	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR ZINC, ZN ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	7	9	9
TRUE CONC (C) MG/L	0.07	0.05	0.07	0.05
MEAN RECOVERY (X)	0.07	0.05	0.07	0.05
ACCURACY(%REL ERROR)	0.87	10.03	2.36	-2.36
OVERALL STD DEV (S)	0.01	0.01	0.01	0.01
OVERALL REL STD DEV, %	18.88	21.38	15.51	17.55
SINGLE STD DEV, (SR)	0.00		0.00	
ANALYST REL DEV, %	6.95		8.64	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	9	8
TRUE CONC (C) MG/L	0.75	0.56	0.75	0.56
MEAN RECOVERY (X)	0.73	0.55	0.73	0.54
ACCURACY(%REL ERROR)	-2.10	-2.58	-2.10	-2.69
OVERALL STD DEV (S)	0.02	0.01	0.04	0.03
OVERALL REL STD DEV, %	2.54	2.56	5.10	5.98
SINGLE STD DEV, (SR)	0.01		0.02	
ANALYST REL DEV, %	1.45		3.19	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	7	9	7
TRUE CONC (C) MG/L	1.13	0.94	1.13	0.94
MEAN RECOVERY (X)	1.13	0.94	1.10	0.91
ACCURACY(%REL ERROR)	-0.33	-0.26	-2.59	-3.02
OVERALL STD DEV (S)	0.05	0.02	0.07	0.02
OVERALL REL STD DEV, %	4.67	2.66	6.09	2.44
SINGLE STD DEV, (SR)	0.04		0.02	
ANALYST REL DEV, %	3.71		1.72	

WATER LEGEND

1 - DISTILLED WATER 1
2 - BACKGROUND WATER 1

STATISTICAL SUMMARY FOR ZINC, IN ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	8	8	7	7
TRUE CONC (C) MG/L	0.07	0.05	0.07	0.05
MEAN RECOVERY (X)	0.06	0.05	0.07	0.06
ACCURACY(%REL ERROR)	-4.55	-3.19	-0.00	18.54
OVERALL STD DEV (S)	0.01	0.02	0.01	0.01
OVERALL REL STD DEV, %	23.06	35.79	8.57	22.89
SINGLE STD DEV, (SR)	0.01		0.00	
ANALYST REL DEV, %	24.80		7.03	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	7	7	8	7
TRUE CONC (C) MG/L	0.75	0.56	0.75	0.56
MEAN RECOVERY (X)	0.74	0.54	0.70	0.54
ACCURACY(%REL ERROR)	-1.58	-3.67	-6.05	-4.18
OVERALL STD DEV (S)	0.03	0.01	0.06	0.04
OVERALL REL STD DEV, %	4.41	1.76	7.90	6.91
SINGLE STD DEV, (SR)	0.01		0.01	
ANALYST REL DEV, %	2.33		2.19	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	8	8	7	8
TRUE CONC (C) MG/L	1.13	0.94	1.13	0.94
MEAN RECOVERY (X)	1.13	0.93	1.13	0.91
ACCURACY(%REL ERROR)	-0.03	-0.89	-0.05	-3.19
OVERALL STD DEV (S)	0.04	0.03	0.04	0.06
OVERALL REL STD DEV, %	3.80	3.55	3.86	7.12
SINGLE STD DEV, (SR)	0.02		0.06	
ANALYST REL DEV, %	1.53		6.03	

WATER LEGEND

1 - DISTILLED WATER 2
2 - BACKGROUND WATER 2

STATISTICAL SUMMARY FOR ZINC, ZN ANALYSES BY WATER TYPE

	WATER 1		WATER 2	
LOW YOUDEN PAIR	5	6	5	6
NUMBER OF DATA POINTS	7	8	7	7
TRUE CONC (C) MG/L	0.28	0.22	0.28	0.22
MEAN RECOVERY (X)	0.28	0.23	0.28	0.23
ACCURACY(%REL ERROR)	-1.28	4.77	-1.43	4.09
OVERALL STD DEV (S)	0.01	0.02	0.01	0.02
OVERALL REL STD DEV, %	2.43	10.21	3.08	7.89
SINGLE STD DEV, (SR)	0.01		0.01	
ANALYST REL DEV, %	4.16		5.39	
MEDIUM YOUDEN PAIR	3	4	3	4
NUMBER OF DATA POINTS	8	8	6	7
TRUE CONC (C) MG/L	0.66	0.47	0.66	0.47
MEAN RECOVERY (X)	0.65	0.46	0.65	0.46
ACCURACY(%REL ERROR)	-2.01	-2.13	-2.20	-2.13
OVERALL STD DEV (S)	0.03	0.02	0.01	0.01
OVERALL REL STD DEV, %	4.27	4.26	1.19	2.33
SINGLE STD DEV, (SR)	0.01		0.00	
ANALYST REL DEV, %	2.07		0.72	
HIGH YOUDEN PAIR	1	2	1	2
NUMBER OF DATA POINTS	7	8	7	7
TRUE CONC (C) MG/L	1.13	0.94	1.13	0.94
MEAN RECOVERY (X)	1.12	0.92	1.11	0.93
ACCURACY(%REL ERROR)	-0.81	-2.29	-1.50	-1.03
OVERALL STD DEV (S)	0.02	0.04	0.02	0.04
OVERALL REL STD DEV, %	1.47	4.18	1.62	4.41
SINGLE STD DEV, (SR)	0.01		0.03	
ANALYST REL DEV, %	1.37		2.91	

WATER LEGEND

1 - DISTILLED WATER 3
2 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR SILVER, AG ANALYSES BY WATER TYPE

	WATER 1		WATER 2		WATER 3		WATER 4	
LOW YOUDEN PAIR	5	6	5	6	5	6	5	6
NUMBER OF DATA POINTS	9	9	8	8	7	7	8	8
TRUE CONC (C) MG/L	0.11	0.09	0.11	0.09	0.11	0.09	0.11	0.09
MEAN RECOVERY (X)	0.10	0.09	0.09	0.08	0.10	0.08	0.10	0.08
ACCURACY(%REL ERROR)	-9.70	-1.23	-14.77	-12.22	-6.49	-6.03	-8.64	-10.42
OVERALL STD DEV (S)	0.02	0.03	0.04	0.03	0.02	0.01	0.02	0.02
OVERALL REL STD DEV, %	17.15	31.49	39.71	38.36	16.87	14.41	24.09	20.28
SINGLE STD DEV, (SR)	0.02		0.03		0.01		0.01	
ANALYST REL DEV, %	18.14		34.21		5.82		12.40	
MEDIUM YOUDEN PAIR	3	4	3	4	3	4	3	4
NUMBER OF DATA POINTS	9	9	9	9	8	6	9	7
TRUE CONC (C) MG/L	1.88	1.50	1.88	1.50	1.88	1.50	1.88	1.50
MEAN RECOVERY (X)	1.42	1.01	1.17	1.07	1.51	1.40	1.57	1.46
ACCURACY(%REL ERROR)	-24.36	-32.73	-37.62	-28.36	-19.71	-6.46	-16.34	-2.54
OVERALL STD DEV (S)	0.56	0.53	0.45	0.40	0.36	0.03	0.43	0.06
OVERALL REL STD DEV, %	39.33	52.05	38.11	36.77	24.07	2.09	27.56	4.00
SINGLE STD DEV, (SR)	0.32		0.39		0.17		0.25	
ANALYST REL DEV, %	25.95		34.64		11.83		16.44	
HIGH YOUDEN PAIR	1	2	1	2	1	2	1	2
NUMBER OF DATA POINTS	9	9	9	9	8	8	8	9
TRUE CONC (C) MG/L	4.13	3.38	4.13	3.38	4.13	3.38	4.13	3.38
MEAN RECOVERY (X)	1.73	1.80	1.91	1.97	2.10	1.99	2.27	2.00
ACCURACY(%REL ERROR)	-58.00	-46.62	-53.65	-41.69	-49.14	-41.20	-45.02	-40.83
OVERALL STD DEV (S)	0.66	0.63	1.00	0.75	0.81	0.62	0.89	0.78
OVERALL REL STD DEV, %	37.80	34.83	52.00	38.25	38.69	31.36	39.02	38.95
SINGLE STD DEV, (SR)	0.29		0.72		0.42		0.26	
ANALYST REL DEV, %	16.36		37.10		20.36		12.07	

WATER LEGEND

1 - DISTILLED WATER 4
2 - BACKGROUND WATER 1
3 - BACKGROUND WATER 2
4 - BACKGROUND WATER 3

STATISTICAL SUMMARY FOR THALLIUM, TL ANALYSES BY WATER TYPE

	WATER 1		WATER 2		WATER 3		WATER 4	
LOW YOUDEN PAIR	5	6	5	6	5	6	5	6
NUMBER OF DATA POINTS	7	7	6	7	7	7	7	7
TRUE CONC (C) MG/L	1.13	0.94	1.13	0.94	1.13	0.94	1.13	0.94
MEAN RECOVERY (X)	1.07	0.95	1.22	0.97	1.19	0.99	1.15	1.05
ACCURACY(%REL ERROR)	-5.31	0.71	7.95	3.22	5.73	4.91	1.50	11.63
OVERALL STD DEV (S)	0.16	0.12	0.06	0.09	0.13	0.06	0.07	0.15
OVERALL REL STD DEV, %	14.62	12.94	4.63	9.52	10.56	5.99	6.05	13.97
SINGLE STD DEV, (SR)	0.05		0.09		0.10		0.13	
ANALYST REL DEV, %	4.92		8.50		9.53		12.22	
MEDIUM YOUDEN PAIR	3	4	3	4	3	4	3	4
NUMBER OF DATA POINTS	6	7	7	7	7	7	6	7
TRUE CONC (C) MG/L	11.30	9.39	11.30	9.39	11.30	9.39	11.30	9.39
MEAN RECOVERY (X)	10.85	8.76	10.93	9.15	10.66	9.30	11.24	9.44
ACCURACY(%REL ERROR)	-3.96	-6.67	-3.24	-2.61	-5.62	-1.00	-0.51	0.58
OVERALL STD DEV (S)	0.40	0.63	0.70	0.52	0.95	0.50	0.19	0.39
OVERALL REL STD DEV, %	3.73	7.15	6.37	5.69	8.93	5.36	1.70	4.12
SINGLE STD DEV, (SR)	0.21		0.27		0.54		0.25	
ANALYST REL DEV, %	2.19		2.70		5.46		2.39	
HIGH YOUDEN PAIR	1	2	1	2	1	2	1	2
NUMBER OF DATA POINTS	7	7	7	7	7	7	7	7
TRUE CONC (C) MG/L	20.70	16.90	20.70	16.90	20.70	16.90	20.70	16.90
MEAN RECOVERY (X)	19.34	16.34	20.30	17.15	20.00	16.31	21.11	17.08
ACCURACY(%REL ERROR)	-6.59	-3.30	0.48	1.47	-3.38	-3.51	2.00	1.04
OVERALL STD DEV (S)	1.46	0.92	1.57	1.07	1.98	1.58	1.37	1.07
OVERALL REL STD DEV, %	7.54	5.63	7.56	6.26	9.88	9.66	6.51	6.29
SINGLE STD DEV, (SR)	0.99		0.44		0.36		0.26	
ANALYST REL DEV, %	5.58		2.32		1.98		1.37	

WATER LEGEND

1 - DISTILLED WATER 4
2 - BACKGROUND WATER 1
3 - BACKGROUND WATER 2
4 - BACKGROUND WATER 3

APPENDIX D

MATRIX EFFECTS

EFFECT OF WATER TYPE ON ALUMINUM, AL ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.98769

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0333	-0.0071

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	58.45911	58.45911		
REG(WATER/DISTILLED)	2	0.00378	0.00189	0.67	0.5173
ERROR	68	0.19324	0.00284		
TOTAL	71	58.65613			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0333	(-0.0595 , 0.1261)	-0.0071	(-0.0379 , 0.0237)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON ALUMINUM, AL ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.01550

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0351	0.0007

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	62.32779	62.32779		
REG(WATER/DISTILLED)	2	0.01956	0.00978	2.46	0.0933
ERROR	68	0.27080	0.00398		
TOTAL	71	62.61815			

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** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0351	(-0.1450 , 0.0748)	0.0007	(-0.0357 , 0.0372)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON ALUMINUM, AL ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.03039

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0204	-0.0100

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	68.38443	68.38443		
REG(WATER/DISTILLED)	2	0.00284	0.00142	0.56	0.5719
ERROR	73	0.18435	0.00253		
TOTAL	76	68.57162			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0204	(-0.0640 , 0.1047)	-0.0100	(-0.0379 , 0.0180)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON BARIUM, BA ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.99345

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0669	-0.1558

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	86.24610	86.84610		
REG(WATER/DISTILLED)	2	1.41594	0.70797	46.84	0.0000
ERROR	72	1.08825	0.01511		
TOTAL	75	89.35029			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	0.0669	(-0.0433 , 0.1771)	-0.1558	(-0.2099 , -0.1016)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON BARIUM, BA ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.02412

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0211	-0.0051

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	108.53954	108.53954		
REG(WATER/DISTILLED)	2	0.00388	0.00194	0.32	0.7248
ERROR	72	0.43151	0.00599		
TOTAL	75	108.97493			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	0.0211	(-0.0482 , 0.0905)	-0.0051	(-0.0391 , 0.0290)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON BARIUM, BA ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.03959

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0151	-0.3229

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	90.88126	90.88126		
REG(WATER/DISTILLED)	2	8.77895	4.38948	105.89	0.0000
ERROR	83	3.44070	0.04145		
TOTAL	86	103.10091			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	0.0151	(-0.1538 , 0.1841)	-0.3229	(-0.4057 , -0.2400)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON BERYLLIUM, BE ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00261

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0048	-0.0212

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	219.39288	219.39288		
REG(WATER/DISTILLED)	2	0.03737	0.01868	3.38	0.0387
ERROR	86	0.47567	0.00553		
TOTAL	89	219.90593			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0048	(-0.0351 , 0.0446)	-0.0212	(-0.0436 , 0.0011)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON BERYLLIUM, BE ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.03372

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0114	-0.0551

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	215.80730	215.80730		
REG(WATER/DISTILLED)	2	0.18736	0.09393	9.74	0.0002
ERROR	77	0.74256	0.00964		
TOTAL	80	216.73772			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0114	(-0.0710 , 0.0482)	-0.0551	(-0.0855 , -0.0246)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON BERYLLIUM, Be ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.01121

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0037	-0.0024

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	215.03611	215.03611		
REG(WATER/DISTILLED)	2	0.00037	0.00019	0.02	0.9778
ERROR	79	0.65841	0.00833		
TOTAL	82	215.69490			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0037	(-0.0556 , 0.0481)	-0.0024	(-0.0307 , 0.0259)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON CALCIUM, CA ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.91726

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.2832	0.0604

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	14.36259	14.36259		
REG(WATER/DISTILLED)	2	0.02692	0.01346	2.20	0.1179
ERROR	70	0.42746	0.00611		
TOTAL	73	14.81697			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.2832	(-0.7424 , 0.1760)	0.0604	(-0.0289 , 0.1492)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON CALCIUM, CA ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.99354

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.1325	-0.0207

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	14.35238	14.35238		
REG(WATER/DISTILLED)	2	0.06030	0.03015	2.82	0.0662
ERROR	73	0.78076	0.01070		
TOTAL	76	15.19343			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	0.1325	(-0.3143 , 0.5793)	-0.0207	(-0.1423 , 0.1010)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON CALCIUM, CA ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.96874

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.4033	0.1201

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	21.82260	21.82260		
REG(WATER/DISTILLED)	2	0.18246	0.09123	2.33	0.1057
ERROR	65	2.54818	0.03920		
TOTAL	68	24.55324			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.4033	(-0.9323 , 0.1258)	0.1201	(-0.0758 , 0.3160)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON CADMIUM, CD ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.02279

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0466	-0.0323

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	214.55573	214.55573		
REG(WATER/DISTILLED)	2	0.05906	0.02953	0.32	0.7250
ERROR	79	7.22613	0.09147		
TOTAL	82	221.84092			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0466	(-0.2217 , 0.1286)	-0.0323	(-0.1257 , 0.0611)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON CADMIUM, CD ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.02806

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0085	0.0508

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	225.83134	225.83134		
REG(WATER/DISTILLED)	2	0.19786	0.09893	0.60	0.5514
ERROR	77	12.69616	0.16489		
TOTAL	80	238.72537			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0085	(-0.2438 , 0.2267)	0.0508	(-0.0769 , 0.1784)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON CADMIUM, CD ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00099

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0009	0.0065

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	165.68703	165.68703		
REG(WATER/DISTILLED)	2	0.00252	0.00126	0.69	0.5069
ERROR	65	0.11911	0.00183		
TOTAL	68	165.80865			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0009	(-0.0276 , 0.0259)	0.0065	(-0.0084 , 0.0214)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON COBALT, CO ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00281

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0074	0.0146

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	34.94055	34.94055		
REG(WATER/DISTILLED)	2	0.00832	0.00416	3.21	0.0467
ERROR	65	0.08416	0.00129		
TOTAL	68	35.03303			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0074	(-0.0258 , 0.0406)	0.0146	(-0.013C , 0.0423)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSCCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON COBALT, CO ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00034

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0010	-0.0121

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	72.24854	72.24854		
REG(WATER/DISTILLED)	2	0.00436	0.00218	1.31	0.2775
ERROR	64	0.10673	0.00167		
TOTAL	67	72.35964			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0010	(-0.0278 , 0.0258)	-0.0121	(-0.0331 , 0.0089)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON COBALT, CO ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.01014

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.2287	-0.0522

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	22.38360	22.38360		
REG(WATER/DISTILLED)	2	0.07074	0.03537	16.79	0.0000
ERROR	67	0.14115	0.00211		
TOTAL	70	22.59549			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	0.2287	(0.0846 , 0.3727)	-0.0522	(-0.0950 , -0.0094)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON CHROMIUM, CR ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.99039

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0449	0.0197

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	136.01831	136.01831		
REG(WATER/DISTILLED)	2	0.02456	0.01228	3.66	0.0305
ERROR	73	0.24469	0.00335		
TOTAL	76	136.28756			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0449	(-0.0823 , -0.0075)	0.0197	(-0.0026 , 0.0419)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON CHROMIUM, CR ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.01259

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0434	-0.0118

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	122.70156	122.70156		
REG(WATER/DISTILLED)	2	0.02029	0.01014	2.99	0.0576
ERROR	63	0.21383	0.00339		
TOTAL	66	122.93567			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0434	(0.0029 , 0.0839)	-0.0118	(-0.0356 , 0.0120)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON CHROMIUM, CR ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.9534

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.1541	0.0467

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	13.84855	13.84855		
REG(WATER/DISTILLED)	2	0.00845	0.00423	0.75	0.4780
ERROR	76	0.43085	0.00567		
TOTAL	79	14.28785			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.1541	(-0.4396 , 0.1315)	0.0467	(-0.0423 , 0.1357)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON COPPER, CU ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = C.98580

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0034	0.0022

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	136.06715	136.06715		
REG(WATER/DISTILLED)	2	0.00034	C.00017	0.14	0.8704
ERROR	66	0.08067	C.00122		
TOTAL	69	136.14816			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0034	(-0.0221 , 0.0153)	C.0022	(-0.0111 , 0.0155)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON COPPER, CU ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00392

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0165	0.0030

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	123.89287	128.89287		
REG(WATER/DISTILLED)	2	0.00478	0.00239	1.18	0.3131
ERROR	61	0.12309	0.00202		
TOTAL	64	129.02074			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0165	(-0.0408 , 0.0077)	0.0030	(-0.0149 , 0.0209)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON COPPER, CU ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.98768

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0053	0.0029

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	137.57247	137.57247		
REG(WATER/DISTILLED)	2	0.00075	0.00037	0.28	0.7555
ERROR	66	0.08768	0.00133		
TOTAL	69	137.66089			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0053	(-0.0249 , 0.0143)	0.0029	(-0.0109 , 0.0167)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON IRON, FE ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00338

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.1789	-0.0545

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	20.38350	20.38350		
REG(WATER/DISTILLED)	2	0.14678	0.07339	34.67	0.0000
ERROR	73	0.15452	0.00212		
TOTAL	76	20.68480			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.1789	(0.0985 , 0.2592)	-0.0545	(-0.0990 , -0.0099)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON IRON, FE ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = C.94930

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.1615	C.0414

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	13.90131	13.90131		
REG(WATER/DISTILLED)	2	0.C7450	C.03725	8.41	0.0005
ERROR	79	0.34982	C.00443		
TOTAL	82	14.32563			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.1615	(-0.3606 , 0.0375)	C.0414	(-0.0364 , 0.1193)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON IRON, FE ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.01008

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.1697	0.0650

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	19.39331	19.39331		
REG(WATER/DISTILLED)	2	0.06679	0.03339	7.53	0.0012
ERROR	61	0.27069	0.00444		
TOTAL	64	19.73079			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.1697	(-0.2985 , -0.0409)	0.0650	(-0.0059 , 0.1358)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON POTASSIUM, K ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.03868

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0001	0.0131

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	28.70358	28.70358		
REG(WATER/DISTILLED)	2	0.02111	0.01055	1.17	0.3165
ERROR	72	0.65001	0.00903		
TOTAL	75	29.37470			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	0.0001	(-0.2367 , 0.2369)	0.0131	(-0.0699 , 0.0962)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON POTASSIUM, K ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.06892

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0623	-0.0583

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	220.77591	220.77591		
REG(WATER/DISTILLED)	2	0.17344	0.08672	4.47	0.0143
ERROR	82	1.58919	0.01938		
TOTAL	85	222.53854			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0623	(-0.0217 , 0.1463)	-0.0583	(-0.1020 , -0.0146)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON POTASSIUM, K ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.08193

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.1249	-0.0459

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	188.28375	188.28375		
REG(WATER/DISTILLED)	2	0.19188	0.09594	2.80	0.0679
ERROR	67	2.29554	0.03426		
TOTAL	70	190.77117			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.1249	(0.0055 , 0.2443)	-0.0459	(-0.1104 , 0.0185)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON MAGNESIUM, MG ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.97565

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0771	0.0018

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	25.35537	25.35537		
REG(WATER/DISTILLED)	2	0.11510	0.05755	8.67	0.0004
ERROR	84	0.55734	0.00664		
TOTAL	87	26.02731			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0771	(-0.3707 , 0.2164)	0.0018	(-0.0690 , 0.0727)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON MAGNESIUM, MG ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.85387

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0783	0.0200

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	30.63604	30.63604		
REG(WATER/DISTILLED)	2	0.02044	0.01022	0.32	0.7241
ERROR	70	2.20579	0.03151		
TOTAL	73	32.86227			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0783	(-0.3937 , 0.2372)	0.0200	(-0.1025 , 0.1425)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON MAGNESIUM, MG ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.96922

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0525	0.0125

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	34.17133	34.17133		
REG(WATER/DISTILLED)	2	0.00917	0.00458	0.97	0.3837
ERROR	76	0.35923	0.00473		
TOTAL	79	34.53973			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0525	(-0.1870 , 0.0819)	0.0125	(-0.0390 , 0.0640)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON MANGANESE, MN ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = C.99978

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0010	-0.0038

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	166.82280	166.82280		
REG(WATER/DISTILLED)	2	0.00063	C.00031	0.03	0.9746
ERROR	72	0.87525	C.01216		
TOTAL	75	167.69868			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0010	(-0.0632 , 0.0612)	-C.0038	(-0.0425 , 0.C349)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSCCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON MANGANESE, MN ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00175

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0185	-0.0029

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	16.84400	16.84400		
REG(WATER/DISTILLED)	2	0.00754	0.00377	1.30	0.2791
ERROR	72	0.20891	0.00290		
TOTAL	75	17.06045			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0185	(-0.0689 , 0.0318)	-0.0029	(-0.0617 , 0.0559)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON MANGANESE, MN ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.98914

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0169	0.0533

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	167.48909	167.48909		
REG(WATER/DISTILLED)	2	0.14428	0.07214	4.34	0.0168
ERROR	70	1.16483	0.01664		
TOTAL	73	168.79819			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0169	(-0.0950 , 0.0611)	0.0533	(0.0080 , 0.0987)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON MOLYBDENUM, MO ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00678

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0937	-0.0215

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	251.36824	251.36824		
REG(WATER/DISTILLED)	2	0.09887	0.04944	0.98	0.3791
ERROR	96	4.84402	0.05046		
TOTAL	99	256.31114			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	0.0937	(-0.0654 , 0.2528)	-0.0215	(-0.0847 , 0.0417)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON MOLYBDENUM, MO ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00991

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0772	-0.0304

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	236.23335	236.23335		
REG(WATER/DISTILLED)	2	0.06155	0.03077	3.23	0.0444
ERROR	90	0.85858	0.00954		
TOTAL	93	237.15347			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0772	(0.0051 , 0.1492)	-0.0304	(-0.0587 , -0.0020)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON MOLYBDENUM, MO ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.02491

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0913	-0.0266

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	216.33607	216.33607		
REG(WATER/DISTILLED)	2	0.06351	0.03175	4.89	0.0100
ERROR	78	0.50651	0.00649		
TOTAL	81	216.90609			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0913	(0.0259 , 0.1568)	-0.0266	(-0.0515 , -0.0017)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON SODIUM, NA ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.98317

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.1692	0.0349

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	18.48431	18.48431		
REG(WATER/DISTILLED)	2	0.02117	0.01058	4.02	0.0218
ERROR	78	0.20529	0.00263		
TOTAL	81	18.71077			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.1692	(-0.3887 , 0.0503)	0.0349	(-0.0187 , 0.0886)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON SODIUM, NA ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.03502

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.1808	-0.0652

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	15.39490	15.39490		
REG(WATER/DISTILLED)	2	0.02045	0.01022	5.03	0.0095
ERROR	61	0.12390	0.00203		
TOTAL	64	15.53926			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	0.1808	(0.0221 , 0.3396)	-0.0652	(-0.1168 , -0.0136)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON SOCIUM, NA ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = C.98720

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0211	0.0079

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	25.48615	25.48615		
REG(WATER/DISTILLED)	2	0.02207	0.01103	1.32	0.2744
ERROR	70	0.58621	0.00837		
TOTAL	73	26.09442			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0211	(-0.6070 , 0.5649)	0.0079	(-0.0739 , 0.0898)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON NICKEL, NI ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00650

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0288	0.0203

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	132.92435	132.92435		
REG(WATER/DISTILLED)	2	0.02440	0.01220	1.42	0.2472
ERROR	78	0.66889	0.00858		
TOTAL	81	133.61764			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0288	(-0.0754 , 0.0179)	0.0203	(-0.0163 , 0.0569)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON NICKEL, NI ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.03504

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0042	0.0243

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	149.13781	149.13781		
REG(WATER/DISTILLED)	2	0.01998	0.00999	0.47	0.6259
ERROR	82	1.73867	0.02120		
TOTAL	85	150.89647			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0042	(-0.0772 , 0.0688)	0.0243	(-0.0320 , 0.0806)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON NICKEL, NI ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.99828

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.2058	-0.0604

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	40.08754	40.08754		
REG(WATER/DISTILLED)	2	0.11084	0.05542	17.81	0.0000
ERROR	81	0.25208	0.00311		
TOTAL	84	40.45046			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.2058	(0.1085 , 0.3031)	-0.0604	(-0.0991 , -0.0217)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONCING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON LEAD, PB ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = C.99696

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0413	-0.0502

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	126.20468	126.20468		
REG(WATER/DISTILLED)	2	0.11853	C.05927	13.81	0.0000
ERROR	81	0.34764	C.00429		
TOTAL	84	126.67085			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0413	(-0.0093 , 0.0918)	-C.0502	(-0.0755 , -0.C249)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSCCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON LEAD, PB ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.99383

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0145	-0.0045

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	118.86185	118.86185		
REG(WATER/DISTILLED)	2	0.00164	0.00082	0.35	0.7063
ERROR	72	0.16907	0.00235		
TOTAL	75	119.03256			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	0.0145	(-0.0252 , 0.0542)	-0.0045	(-0.0242 , 0.0153)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON LEAD, PB ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00049

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.1015	-0.0637

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	115.09799	115.09799		
REG(WATER/DISTILLED)	2	0.96082	0.48041	52.78	0.0000
ERROR	75	0.68266	0.00910		
TOTAL	78	116.74148			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.1015	(-0.1793 , -0.0236)	-0.0637	(-0.1023 , -0.0252)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON ANTIMONY, SB ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.96036

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0389	0.0160

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	196.75610	196.75610		
REG(WATER/DISTILLED)	2	0.01441	0.00720	0.66	0.5172
ERROR	78	0.84497	0.01083		
TOTAL	81	197.61547			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0389	(-0.1210 , 0.0432)	0.0160	(-0.0162 , 0.0482)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON ANTIMONY, Sb ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.9867B

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.1220	0.0327

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	202.21797	202.21797		
REG(WATER/DISTILLED)	2	0.11031	0.05516	5.48	0.0060
ERROR	75	0.75510	0.01007		
TOTAL	78	203.08338			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.1220	(-0.2052 , -0.0388)	0.0327	(0.0006 , 0.0647)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON ANTIMONY, SB ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.99503

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0699	0.0163

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	197.32195	197.32195		
REG(WATER/DISTILLED)	2	0.04214	0.02107	2.60	0.0809
ERROR	73	0.59093	0.00809		
TOTAL	76	197.95501			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0699	(-0.1423 , 0.0025)	0.0163	(-0.0125 , 0.0451)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON VANADIUM, V ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.01728

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0394	-0.0050

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	226.98705	226.98705		
REG(WATER/DISTILLED)	2	0.01403	0.00702	0.84	0.4364
ERROR	79	0.66152	0.00837		
TOTAL	82	227.66260			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0394	(-0.0548 , 0.1337)	-0.0050	(-0.0326 , 0.0227)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON VANADIUM, V ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00592

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0199	0.0085

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	195.11008	195.11008		
REG(WATER/DISTILLED)	2	0.00384	0.00192	0.40	0.6726
ERROR	67	0.32264	0.00482		
TOTAL	70	195.43656			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0199	(-0.0986 , 0.0587)	0.0085	(-0.0141 , 0.0310)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON VANADIUM, V ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.00950

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0301	0.0005

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	173.69412	173.69412		
REG(WATER/DISTILLED)	2	0.01195	0.00598	1.39	0.2578
ERROR	61	0.26298	0.00431		
TOTAL	64	173.96905			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0301	(-0.1088 , 0.0485)	0.0005	(-0.0220 , 0.0231)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON ZINC, IN ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.98213

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0031	0.0117

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	152.48255	152.48255		
REG(WATER/DISTILLED)	2	0.01071	0.00535	0.44	0.6456
ERROR	81	0.98570	0.01217		
TOTAL	84	153.47895			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERCEPT(WATER-DISTILLED) INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	SLOPE(WATER-DISTILLED) INTERVAL
2	-0.0031	(-0.0725 , 0.0662)	0.0117	(-0.0281 , 0.0515)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONCING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON ZINC, IN ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 1.02941

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	-0.0199	-0.0709

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	148.43315	148.43315		
REG(WATER/DISTILLED)	2	0.25459	0.12729	4.32	0.0167
ERROR	78	2.29958	0.02948		
TOTAL	81	150.98732			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	-0.0199	(-0.1303 , 0.0905)	-0.0709	(-0.1339 , -0.0080)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON ZINC, ZN ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.97596

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0067	0.0033

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	29.56873	29.56873		
REG(WATER/DISTILLED)	2	0.00052	0.00026	0.12	0.8831
ERROR	76	0.15741	0.00207		
TOTAL	79	29.72665			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0067	(-0.0260 , 0.0393)	0.0033	(-0.0334 , 0.0400)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSCCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON SILVER, AG ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = C.80555

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0077	0.0347
3	0.1064	0.0574
4	0.2061	0.0759

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	337.93268	337.93268		
REG(WATER/DISTILLED)	6	1.70822	C.28470	1.66	C.1336
ERROR	183	31.41514	C.17167		
TOTAL	190	371.05605			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0077	(-0.2057 , 0.2210)	C.0347	(-0.1032 , 0.1727)
3	0.1064	(-0.1186 , 0.3314)	C.0574	(-0.0854 , 0.2002)
4	0.2061	(-0.0108 , 0.4230)	C.0759	(-0.0629 , 0.2148)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

EFFECT OF WATER TYPE ON THALLIUM, TL ANALYSIS

** POINT ESTIMATES **

DISTILLED WATER SLOPE:GAMMA(1) = 0.99109

WATER	INTERCEPT(WATER-DISTILLED)	SLOPE(WATER-DISTILLED)
2	0.0742	-0.0104
3	0.0811	-0.0235
4	0.0754	-0.0089

** ANALYSIS OF VARIANCE **

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROB
REG(DISTILLED)	1	250.20476	250.20476		
REG(WATER/DISTILLED)	6	0.10502	0.01750	3.02	0.0081
ERROR	149	0.86279	0.00579		
TOTAL	156	251.17256			

** TABLE OF 95% CONFIDENCE INTERVALS FOR THE DIFFERENCES BETWEEN INTERCEPTS AND THE DIFFERENCES BETWEEN SLOPES **

WATER	INTERCEPT(WATER-DISTILLED) ESTIMATE	INTERVAL	SLOPE(WATER-DISTILLED) ESTIMATE	INTERVAL
2	0.0742	(-0.0028 , 0.1513)	-0.0104	(-0.0459 , 0.0250)
3	0.0811	(0.0043 , 0.1578)	-0.0235	(-0.0586 , 0.0115)
4	0.0754	(-0.0030 , 0.1539)	-0.0089	(-0.0440 , 0.0262)

NOTE: IF ZERO IS CONTAINED WITHIN A GIVEN CONFIDENCE INTERVAL THEN THERE IS NO STATISTICAL SIGNIFICANCE BETWEEN DISTILLED WATER AND THE CORRESPONDING WASTE WATER FOR THE ASSOCIATED PARAMETER(INTERCEPT/SLOPE).

THE SLOPE AND INTERCEPT ESTIMATES FROM THIS ANALYSIS ARE NOT THE SAME AS THOSE OBTAINED FROM THE PRECISION AND ACCURACY REGRESSIONS PERFORMED EARLIER.

APPENDIX E

METHOD DETECTION LIMIT STUDY

RAW DATA

AVERAGE MDLs IN EACH WATER TYPE (mg/L)
(Mean/Std. Dev.)

Element	Background Water 1	Background Water 2	Background Water 3	Reagent Water
Al	0.27/0.21	0.25/0.17	0.25/0.18	0.27/0.19
Ba	0.089/0.033	0.085/0.034	0.09/0.03	0.098/0.062
Be	0.005/0.002	0.005/0.002	0.005/0.002	0.006/0.002
Ca	-	-	-	0.023/0.008
Fe	-	-	-	0.050/0.039
K	-	0.005/0.006	0.005/0.006	0.005/0.006
Mg	-	-	-	0.002/0.001
Mo	0.13/0.14	0.12/0.11	0.089/0.049	0.13/0.14
Na	-	-	-	0.009/0.008
Sb	0.42/0.31	0.42/0.31	0.48/0.35	0.41/0.30
V	0.25/0.12	0.29/0.16	0.26/0.13	0.28/0.14
Ag	0.014/0.011	0.014/0.011	0.012/0.009	0.014/0.011
Cd	0.007/0.007	0.010/0.015	0.006/0.006	0.007/0.007
Co	0.030/0.012	0.029/0.009	-	0.043/0.028
Cr	0.052/0.047	0.053/0.049	-	0.056/0.051
Cu	0.008/0.008	0.006/0.006	0.006/0.005	0.006/0.006
Mn	0.015/0.009	-	0.015/0.009	0.016/0.010
Ni	0.055/0.066	0.028/0.018	-	0.035/0.025
Pb	0.08/0.08	0.083/0.071	0.083/0.068	0.084/0.073
Tl	0.22/0.17	0.16/0.12	0.17/0.12	0.185/0.133
Zn	0.005/0.005	0.008/0.010	0.008/0.010	0.0079/0.0100

BACKGROUND WATER 1 MDLs (mg/L)

Laboratory Code

Element	1	2	3	4	5	6	7	8	9
Al	0.14	0.26	0	0.71	0.146	0.30	0.2531	0.365	1.0*
Ba	0.068	.056	0.4914*	0.13	0.0553	0.06	0.0954	0.124	0.12
Be	0.0041	0.006	0.008	0.007	0.0019	0.004	0.0060	0.006	0.03*
Ca	-	-	-	-	-	-	-	-	-
Fe	-	-	-	-	-	-	-	-	-
K	-	-	-	-	-	-	-	-	-
Mg	-	-	-	-	-	-	-	-	-
Mo	0.035	0.11	0.47	0.067	0.0858	0.10	0.0604	0.096	1.3
Na	-	-	-	-	-	-	-	-	-
Sb	0.18	0.14	0.40	0.76	0.088	0.25	0.7205	0.871	2.0
V	0.40	0.16	1.111*	0.44	0.1881	0.30	0.2433	0.133	0.17
Ag	0.0083	0.005	0.026	0.027	0.01	0.03	0.0102	0.013	0
Cd	0.0038	0.002	0.0055	0.064*	0.0013	0.02	0.0164	0.009	0
Co	0.034	0.014	0.036	0.10*	0.0182	0.10*	0.0309	0.028	0.05
Cr	0.014	0.020	0.080	0.019	0.0124	0.14	0.0372	0.093	0.43
Cu	0.0081	0.013	0	0.008	0.023	0.06*	0	0.009	0
Mn	0.015	0.02	0	0.023	0.013	0.03	0.0128	0.009	0.01
Ni	0.015	0.02	0	0.06	0.026	0.08	0.0372	0.034	0.22
Pb	0.040	0.06	0.25	0.10	0.038	0	0.3463*	0.061	0.09
Tl	0.085	0.04	0.28	0.42	0.082	0.20	0.1318	0.567	0.21
Zn	0.0053	0.0022	0	0.028*	0.0021	0.03*	0.0106	0.011	0

* Determined to be outliers based upon Cochran's test of homogeneity at the 1 percent significance level.

BACKGROUND WATER 2 IN MDLs (mg/L)

Laboratory Code

Element	1	2	3	4	5	6	7	8	9
Al	0.14	0.24	0	0.54	0.11	0.30	0.2559	0.381	1.0*
Ba	0.066	0.059	0.4597	0.13	0.0385	0.06	0.0901	0.120	0.12
Be	0.0034	0.006	0.0080	0.0007	0.00195	0.004	0.0061	0.006	0.03*
Ca	-	-	-	-	-	-	-	-	-
Fe	-	-	-	-	-	-	-	-	-
K	0.018	0	0.0025	0.006	0.00081	0.002	0.0010	0.089*	0.01
Mg	-	-	-	-	-	-	-	-	-
Mo	0.034	0.11	0.3857	0.074	0.0822	0.10	0.0635	0.089	1.2*
NA	-	-	-	-	-	-	-	-	-
Sb	0.18	0.15	0.3837	0.73	0.088	0.25	0.7197	0.892	2.1*
V	0.39	0.17	1.111*	0.62	0.194	0.33	0.2521	0.129	0.20
Ag	0.008	0.005	0.0259	0.026	0.01	0.03	0.0104	0.013	0
Cd	0.0037	0.002	0.0058	0.045	0.0015	0.16*	0.0164	0.009	0
Co	0.033	0.014	0.0357	0.084*	0.017	0.03	0.0297	0.035	0.04
Cr	0.014	0.020	0.0806	0.019	0.0162	0.14	0.0306	0.104	0.44
Cu	0.0079	0.013	0	0.008	0.0132	0.06*	0	0.009	0
Mn	-	-	-	-	-	-	-	-	-
Ni	0.015	0.02	0	0.06	0.037	0.02	0.0359	0.034	0.21*
Pb	0.040	0.06	0.2424	0.10	0.070	0	0.3461*	0.060	0.09
Tl	0.086	0.04	0.2838	0.40	0.086	0.07	0.1298	0.568*	0.15
Zn	0.0051	0.0021	0	0.03	0.003	0.08*	0.0111	0.012	0

* Determined to be outliers based upon Cochran's test of homogeneity at the 1 percent significance level.

BACKGROUND WATER 3 IN MDLs (mg/L)

Laboratory Code

Element	1	2	3	4	5	6	7	8	9
Al	0.14	0.23	0	0.59	0.0943	0.27	0.2494	0.394	0.92*
Ba	0.066	0.059	0.4750*	0.13	0.057	0.06	0.0823	0.140	0.09
Be	0.0037	0.006	0.0076	0.006	0.0018	0.004	0.0059	0.006	0.03*
Ca	-	-	-	-	-	-	-	-	-
Fe	-	-	-	-	-	-	-	-	-
K	0.018	0	0.0022	0.006	0.00065	0.002	0.0010	0.090*	0.01
Mg	-	-	-	-	-	-	-	-	-
Mo	0.035	0.11	0.1901	0.067	0.046	0.10	0.0619	0.102	0.60*
Na	-	-	-	-	-	-	-	-	-
Sb	0.19	0.15	0.3882	0.97	0.0924	0.38	0.7247	0.920	1.8*
V	0.39	0.16	1.071*	0.50	0.162	0.30	0.2487	0.132	0.16
Ag	0.0083	0.005	0.0252	0.026	0.01	0.035*	0.0102	0.014	0
Cd	0.0039	0.002	0.0055	0.051*	0.015	0.001	0.0184	0.009	0
Co	-	-	-	-	-	-	-	-	-
Cr	-	-	-	-	-	-	-	-	-
Cu	0.0082	0.013	0	0.008	0.0111	0.06*	0	0.009	0
Mn	0.016	0.02	0	0.025	0.013	0.009	0.0152	0.009	0.03
Ni	-	-	-	-	-	-	-	-	-
Pb	0.040	0.06	0.2303	0.10	0.071	0	0.3467*	0.061	0.1
Tl	0.084	0.04	0.2530	0.43	0.097	0.20	0.1277	0.561*	0.15
Zn	0.0052	0.0021	0	0.028	0.002	0.08*	0.0115	0.012	0

* Determined to be outliers based upon Cochran's test of homogeneity at the 1 percent significance level.

REAGENT WATER IN MDLs (mg/L)

Laboratory Code

Element	1	2	3	4	5	6	7	8	9
Al	0.13	0.23	0	0.62	0.113	0.34	0.2919	0.404	1.1*
Ba	0.065	0.061	0.4222*	0.13	0.04	0.05	0.0883	0.122	0.23
Be	0.0033	0.006	0.0083	0.007	0.0015	0.005	0.0063	0.007	0.02*
C	0.022	0.019	0.0222	0.032	0.0281	0.03	0.0164	0.028	0.005
Fe	0.014	0.014	0.0741	0.15*	0.0193	0.13	0.0530	0.037	0.06
K	0.017	0	0.0024	0.006	0.0008	0.002	0.0010	0.066*	0.01
Mg	0.0057*	0.00094	0.0018	0.004	0.0007	0	0.0031	0.003	0.003
Mo	0.035	0.12	0.4655	0.070	0.093	0.10	0.0639	0.096	1.1*
Na	0.015	0.0025	0.0236	0.012	0.0022	0.001	0.0024	0	0.01
Sb	0.18	0.15	0.3793	0.59	0.079	0.25	0.7217	0.894	2.0*
V	0.40	0.17	1.429*	0.55	0.1783	0.33	0.2611	0.132	0.19
Ag	0.0081	0.005	0.0268	0.026	0.01	0.03	0.0106	0.012	0
Cd	0.0039	0.002	0.0055	0.055*	0.001	0.02	0.0166	0.009	0
Co	0.034	0.014	0.0362	0.088	0.013	0.09	0.0307	0.035	0.05
Cr	0.014	0.022	0.0898	0.027	0.0126	0.15	0.0345	0.098	0.45*
Cu	0.0081	0.013	0	0.008	0.0122	0.06*	0	0.009	0
Mn	0.014	0.02	0	0.028	0.009	0.03	0.0135	0.009	0.02
Ni	0.015	0.02	0	0.06	0.034	0.08	0.0381	0.034	0.22*
Pb	0.041	0.06	0.2424	0.11	0.054	0	0.3582	0.061	0.10
Tl	0.089	0.04	0.2692	0.46	0.101	0.21	0.1406	0.508*	0.17
Zn	0.0052	0.0021	0	0.030	0.003	0.06*	0.0109	0.012	0

* Determined to be outliers based upon Chochran's test of homogeneity at the 1 percent significance level.

APPENDIX F

LOW CONCENTRATION LEVEL

STUDY

PRECISION SUMMARY RESULTS

%RSD AVERAGES FOR BACKGROUND WATER 1 AND REAGENT WATER 1

Analyte	Ampul 5-6 Overall	Ampul 5-6 Single-analyst	Ampul 7-8 Overall	Ampul 7-8 Single-analyst	No. of Outliers 5-6	No. of Outliers 7-8
ALUMINUM						
Reagent Water 1	9.22	2.67	34.8	13.8	0	3
Background Water 1	10.1	4.38	35.7	19.1	0	1
BARIUM						
Reagent Water 1	6.54	6.87	16.4	12.1	1	0
Background Water 1	15.5	8.59	22.6	11.5	2	2
BERYLLIUM						
Reagent Water 1	9.12	6.10	15.9	9.17	3	0
Background Water 1	13.9	9.79	15.6	13.4	0	0
CADMIUM						
Reagent Water 1	16.3	5.20	10.6	7.62	2	4
Background Water 1	26.6	10.6	26.6	9.42	2	4
CHROMIUM						
Reagent Water 1	13.9	6.21	13.7	7.37	1	0
Background Water 1	12.7	5.20	15.3	6.85	0	1
COPPER						
Reagent Water 1	6.09	4.32	11.1	6.29	2	0
Background Water 1	5.87	3.61	15.1	7.48	1	0
MOLYBDENUM						
Reagent Water 1	27.0	9.88	43.8	13.3	0	2
Background Water 1	22.0	11.6	27.0	13.3	0	1
NICKEL						
Reagent Water 1	9.28	6.67	15.9	11.4	1	0
Background Water 1	25.3	7.08	19.6	17.6	0	1
LEAD						
Reagent Water 1	9.61	5.22	18.8	6.50	1	0
Background Water 1	16.6	5.15	32.8	13.3	0	0
ANTIMONY						
Reagent Water 1	21.2	5.05	35.1	6.18	2	4
Background Water 1	21.6	8.36	17.2	10.5	0	5
VANADIUM						
Reagent Water 1	13.0	6.43	24.0	8.83	0	1
Background Water 1	19.4	8.37	27.7	16.5	0	0

%RSD AVERAGES FOR BACKGROUND WATER 1 AND REAGENT WATER 1

Analyte	Ampul 5-6 Overall	Ampul 5-6 Single-analyst	Ampul 7-8 Overall	Ampul 7-8 Single-analyst	No. of Outliers 5-6	No. of Outliers 7-8
ZINC						
Reagent Water 1	24.7	18.3	33.0	9.98	0	4
Background Water 1	16.5	8.64	28.7	22.1	0	1
SILVER						
Reagent Water 1	24.3	18.1	25.2	8.95	0	4
Background Water 1	39.0	34.2	36.4	16.0	2	6
THALLIUM						
Reagent Water 1	15.6	5.5	16.3	9.2	0	2
Background Water 1	6.9	7.5	8.6	8.7	0	0

%RSD AVERAGES FOR BACKGROUND WATER 2 AND REAGENT WATER 2

Analyte	Ampul 5-6 Overall	Ampul 5-6 Single-analyst	Ampul 7-8 Overall	Ampul 7-8 Single-analyst	No. of Outliers 5-6	No. of Outliers 7-8
ALUMINUM						
Reagent Water 2	9.96	3.75	34.8	13.8	-	-
Background Water 2	10.6	2.52	34.0	19.1	0	3
BARIUM						
Reagent Water 2	17.4	9.24	16.4	12.1	-	-
Background Water 2	17.6	4.61	17.7	7.58	1	0
BERYLLIUM						
Reagent Water 2	18.7	10.4	15.9	9.17	0	-
Background Water 2	11.0	5.42	10.5	10.9	0	0
CADMIUM						
Reagent Water 2	22.2	10.6	10.6	7.62	1	-
Background Water 2	28.7	11.8	16.2	10.5	1	4
CHROMIUM						
Reagent Water 2	14.1	2.52	13.7	7.37	1	-
Background Water 2	9.70	4.83	24.1	14.0	3	0
COPPER						
Reagent Water 2	8.66	3.17	11.1	6.29	1	-
Background Water 2	11.7	8.13	9.78	5.47	0	0
MOLYBDENUM						
Reagent Water 2	11.1	4.64	43.8	13.3	0	-
Background Water 2	10.9	5.89	14.0	8.05	0	0
NICKEL						
Reagent Water 2	19.9	13.4	15.9	11.4	1	-
Background Water 2	26.4	17.5	40.5	13.6	1	0
LEAD						
Reagent Water 2	7.88	6.46	18.8	6.50	1	-
Background Water 2	18.7	4.52	7.68	5.98	0	3
ANTIMONY						
Reagent Water 2	10.4	10.5	35.1	6.18	2	-
Background Water 2	32.7	14.2	19.5	6.64	1	7
VANADIUM						
Reagent Water 2	19.9	7.30	24.0	8.33	0	-
Background Water 2	13.4	5.23	19.0	9.89	0	0

%RSD AVERAGES FOR BACKGROUND WATER 2 AND REAGENT WATER 2

Analyte	Ampul 5-6 Overall	Ampul 5-6 Single-analyst	Ampul 7-8 Overall	Ampul 7-8 Single-analyst	No. of Outliers 5-6	No. of Outliers 7-8
ZINC						
Reagent Water 2	28.3	23.8	33.0	9.98	0	-
Background Water 2	18.6	7.22	46.9	30.8	3	2
SILVER						
Reagent Water 2	24.3	18.1	25.0	9.00	0	4
Background Water 2	16.5	5.75	48.8	24.7	2	4
THALLIUM						
Reagent Water 2	15.6	5.5	16.3	9.2	0	4
Background Water 2	9.0	8.4	11.2	8.1	0	2

%RSD AVERAGES FOR BACKGROUND WATER 3 AND REAGENT WATER 3

Analyte	Ampul 5-6 Overall	Ampul 5-6 Single-analyst	Ampul 7-8 Overall	Ampul 7-8 Single-analyst	No. of Outliers 5-6	No. of Outliers 7-8
ALUMINUM						
Reagent Water 3	10.3	5.34	34.8	13.9	0	-
Background Water 3	6.94	4.51	44.3	17.8	0	0
BARIUM						
Reagent Water 3	12.0	10.3	16.4	12.1	0	-
Background Water 3	21.3	9.84	19.1	6.45	0	0
BERYLLIUM						
Reagent Water 3	18.6	9.91	15.9	9.17	0	-
Background Water 3	14.6	8.08	22.3	11.8	0	0
CADMIUM						
Reagent Water 3	13.1	8.04	10.6	7.62	3	-
Background Water 3	43.3	8.82	39.0	7.94	0	2
CHROMIUM						
Reagent Water 3	7.18	3.83	13.7	7.37	1	-
Background Water 3	16.2	8.12	73.7	19.5	0	3
COPPER						
Reagent Water 3	6.19	4.18	11.1	6.29	1	-
Background Water 3	12.3	7.35	14.8	8.42	0	1
MOLYBDENUM						
Reagent Water 3	14.4	7.48	43.8	13.3	0	-
Background Water 3	12.8	5.85	12.0	5.00	1	2
NICKEL						
Reagent Water 3	4.32	4.20	15.9	11.4	0	-
Background Water 3	6.18	3.40	54.8	27.0	2	3
LEAD						
Reagent Water 3	19.6	10.5	18.8	6.50	0	-
Background Water 3	10.4	9.34	28.3	11.6	1	2
ANTIMONY						
Reagent Water 3	25.0	9.67	35.1	6.18	1	-
Background Water 3	24.2	15.3	21.4	24.6	1	6
VANADIUM						
Reagent Water 3	13.9	8.01	23.6	8.33	0	-
Background Water 3	16.1	6.20	24.6	10.2	0	0

%RSD AVERAGES FOR BACKGROUND WATER 3 AND REAGENT WATER 3

Analyte	Ampul 5-6 Overall	Ampul 5-6 Single-analyst	Ampul 7-8 Overall	Ampul 7-8 Single-analyst	No. of Outliers 5-6	No. of Outliers 7-8
ZINC						
Reagent Water 3	6.56	4.19	33.0	9.98	2	-
Background Water 3	6.15	6.20	37.4	46.1	0	1
SILVER						
Reagent Water 3	24.3	18.1	25.0	9.00	0	4
Background Water 3	22.2	12.4	52.6	30.9	2	2
THALLIUM						
Reagent Water 3	15.6	5.50	16.3	9.20	0	2
Background Water 3	13.7	11.0	17.8	12.8	0	1